

MODERN Machine Shop

November, 1947

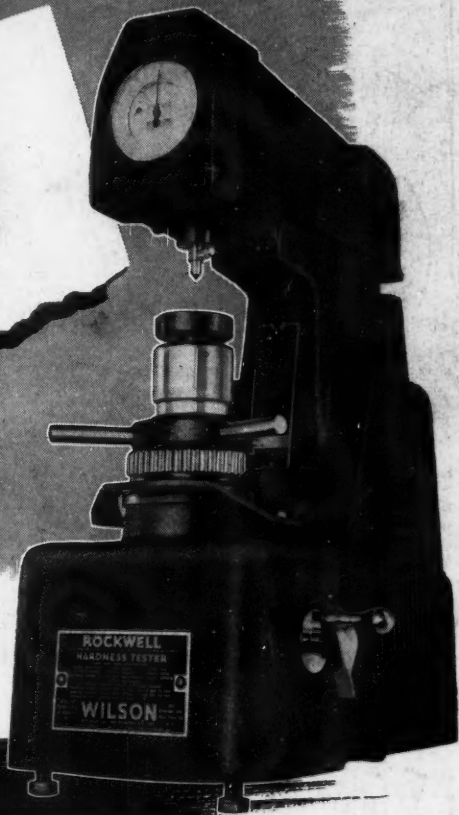
Table of Contents
Page 5

NOV 11 1947

DETROIT

**"ROCKWELL"
HARDNESS TESTER**
Made Only by Wilson

**DELIVERY
FROM STOCK**



WILSON

MECHANICAL INSTRUMENT CO., INC.

AN ASSOCIATE COMPANY OF AMERICAN CHAIN & CABLE COMPANY, INC.

230-G PARK AVENUE, NEW YORK 17, N. Y.

ACCO



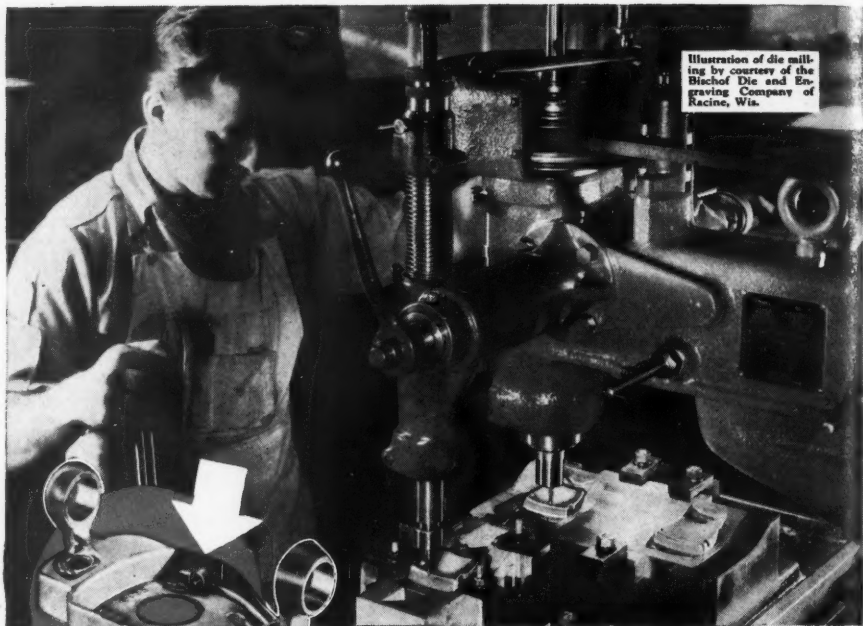


Illustration of die milling by courtesy of the Bischof Die and Engraving Company of Racine, Wis.



BUT... GORTON

Tracer Controlled Milling DID THE JOB

A Gorton Super-Speed Tracer-Controlled Milling Machine with adjustable ram together with a super-speed spindle made it possible to mill to a depth of $\frac{1}{2}$ " with a $\frac{1}{16}$ " dia. cutter (producing thin wall in finished die casting; see arrow). This was for the main frame for a vibrating hand massager manufactured by the John Oster Manufacturing Company of Racine, Wis. Only one Master model was used to mill a two-cavity die casting die with a minimum of hand finishing—this is typical of Gorton Tracer-Controlled equipment.

If you are interested in die and mold work, production profiling, super-speed milling, engraving, graduating, contour grinding or electric etching of hardened parts, let...

GORTON PRE-DETERMINE RESULTS FOR YOU

Mail us complete description with prints of your job. Gorton engineers will furnish you with a production estimate of it tooled on a Gorton—no obligation.



Send for Bulletin 1655 on Tracer Control—use handy coupon at right—today!

GEORGE GORTON MACHINE CO.

Tracer Controlled Milling

1711 RACINE STREET • RACINE, WISCONSIN, U. S. A.

THE JOB IN BRIEF

- Job: Mill 2-cavity die casting die from single soft master.
- Material: Hot formed die steel.
- Machine: Gorton 8 $\frac{1}{2}$ -D Super-Speed Duplicator.
- Method: Two machine settings per cavity without resetting work.
- Cutters: Gorton single flute; minimum dia., $\frac{1}{16}$ "; maximum depth of cut, $\frac{1}{2}$ ".
- Spindle Speeds: Roughing, 250 r.p.m.; finishing, 6000 r.p.m.
- Limits: .002" with minimum hand finishing.

PLEASE SEND WITHOUT OBLIGATION

Bulletin No. 1655-1711

Name.....

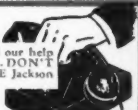
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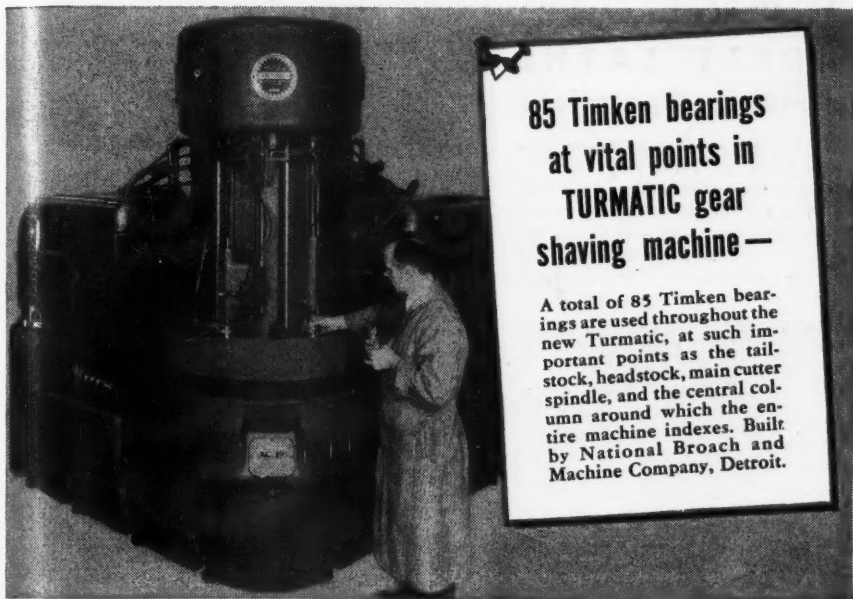
City.....Zone.....State.....

When you need our help in a hurry... DON'T WRITE, PHONE JACKSON 417.



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NOV 11 1947

Indexing accuracy of Turmatic gear shaver assured by Timken bearings



85 Timken bearings at vital points in TURMATIC gear shaving machine—

A total of 85 Timken bearings are used throughout the new Turmatic, at such important points as the tailstock, headstock, main cutter spindle, and the central column around which the entire machine indexes. Built by National Broach and Machine Company, Detroit.

IN the new Red Ring Turmatic Gear Shaving Machine, accurate indexing from one station to another is largely dependent upon the bearings on the central column. That's why the manufacturer selected Timken bearings.

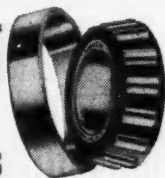
With Timken bearings, shafts are kept in rigid alignment; proper gear contact is assured. Maximum support is provided by the line contact between rolls and races. And because of their tapered construction, Timken bearings carry any combination of radial and thrust loads, distributing the load evenly over the full length of the roller surfaces. They may be taken up in assembly and accurately pre-loaded to any desired degree.

To further assure precision in machine tools, the Timken bearing is a "Gen-

erated Unit Assembly"—parts perfectly mated—no need for breaking in or final adjustment on the job. Made of heat-treated Timken fine alloy steel, Timken bearings safely carry the heaviest loads and normally last the life of the machine.

Look for the trade-mark "Timken" on every bearing you use. No other bearing combines *all* the advantages you get with Timken Bearings. The Timken Roller Bearing Company, Canton 6, O.

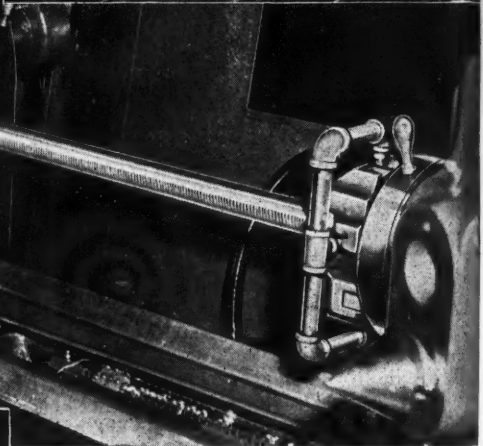
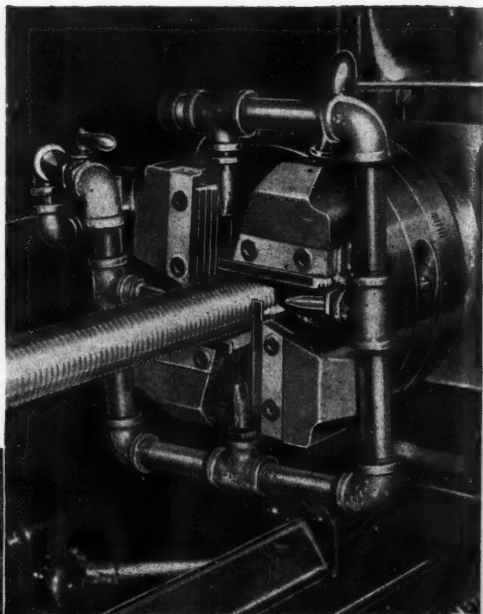
TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
**TAPERED
ROLLER BEARINGS**



NOT JUST A BALL NOT JUST A ROLLER THE TIMKEN TAPERED ROLLER BEARING TAKES RADIAL AND THRUST LOADS ON ANY COMBINATION

LANDMATIC HEADS... for TURRET LATHE Threading Operations

"Only one cut is taken in forming the thread from the blank tube. This results in a tremendous saving in time over the former practice of chasing and grinding the threads, grinding being no longer necessary because of the accurate performance of the die head chasers," writes the manufacturer.



LANDIS
MACHINE COMPANY
WAYNESBORO, PA., U.S.A.

Illustrations show a 3" LANDMATIC Die Head used by a Western aircraft company to thread long Wing-Flap Retracting Screws to extremely close tolerances. An Acme thread of 2" diameter, 4 threads per inch, is being cut to a length of 45 1/2" on heat treated alloy steel tube 48" in length.

Write for Bulletins F-80 and F-90

LATEST DEVELOPMENT IN AUTOMATIC GRINDING



**Heald's brand NEW Internals grind
more holes... faster... at less cost**

Here's the answer to your large scale grinding problems—a complete new line of Heald Gage-Matic and Size-Matic Internals, the result of over 20 years experience in automatic grinding development.

This new line includes a model exactly suited to your particular job, featuring improved Heald construction and entirely new design. Such as:

AUTOMATIC GRINDING CYCLES
UNIFORM SPEEDS AND FEEDS
CENTRALIZED CONTROLS
ANTI-FRICTION WHEELSLIDE
PERMANENTLY LUBRICATED WHEELHEADS
SEALED HYDRAULIC SYSTEM AND ISOLATED RESERVOIR

You'll find the new Heald Internals more convenient to operate and easier to maintain. For specific applications, get in touch with the Heald branch office nearest you.

ANOTHER OF
18 NEW
HEALD MACHINES



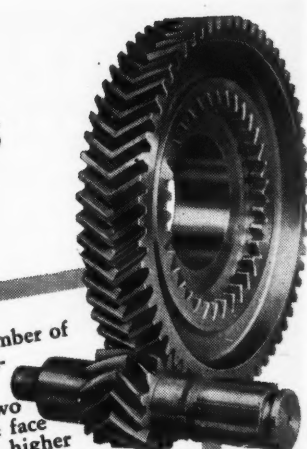
SEND FOR BULLETIN on the new Heald Nos. 271-371 Internal Grinding Machines.



THE HEALD MACHINE COMPANY, Worcester 6, Mass.

Branch Offices in Chicago • Cleveland • Dayton • Detroit • Indianapolis • Lansing • New York

WHY machine tool gears need BACKBONES



The Farrel-Sykes Gear with a Backbone has a number of outstanding advantages for machine tool applications.

The backbone, formed by the juncture of the two helices without a center groove, puts the entire face width to work, providing extra strength and higher load-carrying capacity in small space—a definite advantage for "designed-in" gears.

Generation by the famous Farrel-Sykes method makes these gears extremely accurate and exceptionally quiet and smooth-running. The combined characteristics of overlap or interlacing of the teeth, gradual tooth engagement and inclined line of pressure reduce wear and maintain the involute profile and correct tooth action throughout a long gear life.

These and other features of design and manufacture contribute to dependable performance, continuous operating efficiency and maintenance economy.

Farrel-Sykes gears are made in any size up to 20 feet in diameter, for almost any application. Information and engineering assistance available without obligation.

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Plants: Ansonia and Derby, Conn., Buffalo, N. Y.

Sales Offices: Ansonia, Buffalo, New York, Boston, Pittsburgh, Akron, Chicago, Los Angeles, Tulsa, Houston



Farrel-Birmingham

FB-414

HOWARD CAMPBELL
Editor

GENE J. SCHWARBER
Advertising Manager

J. C. DUFF
Circulation Manager

RICHARD S. KLINE
GEORGE E. HAY
431 Main St., Cincinnati 2
Main 0182

G. M. FILLMORE
342 Madison Ave.
New York 17
Murray Hill 6-3899

JOHN M. KRINGS
Tribune Tower, Chicago 11
Delaware 5441

CHARLES H. DEILY, JR.
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NORMAN S. ROGERS
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Published monthly and
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GARDNER PUBLICATIONS, Inc.
431 Main St., Cincinnati 2, Ohio

Howard Campbell President
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Printed in U. S. A.

MODERN Machine Shop Contents

Special Tooling for Servel Gas Refrigerators 124
By GERALD ELDRIDGE STEDMAN

Process Engineering Pays Dividends 134
By CHARLES DELMAR TOWNSEND

The Rubber Die Press as a Tool for Forming
Aluminum, Part II 154
By E. R. YARHAM

Report on the Machine Tool Show 186

New Machines Presented at the Machine Tool Show 220

Ideas from Readers

—Sphere Turning to Close Limits, by William E.
Welch 244

—Milling Coiled Stock, by John E. Hyler 250

—Handy Measuring Tool, by D. E. McDonald 254

—Stud Removing Simplified 258

News of the Industry 262

New Shop Equipment 264

Services Directory 390

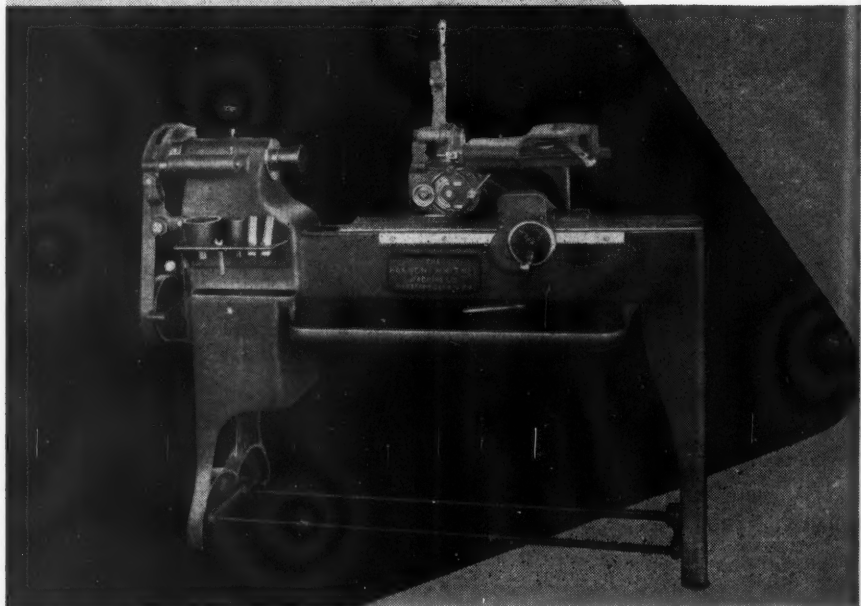
"Where to Get It" 392

Cartoon 396

Editorial 398

Index to Advertisements 401

CORRECT CENTERING... *is an* **IMPORTANT OPERATION**



The Hanson-Whitney Rapid Precision Centering Machine has solved the problem of accurate, rapid centering of bright rolled stock, or parts produced on bar machines where centers are required for a succeeding operation. The correct principle of rotating work in center-rest is utilized. Center is drilled and shaved in sep-

arate operations. Center-rest is quick-acting roller type, instantly adjustable for diameter through observation dial. The unique, quick-acting work chucks, in conjunction with foot-treadle operation, enable varying diameters to be handled with the utmost speed and accuracy.

Write for descriptive folder today.

Hanson Whitney

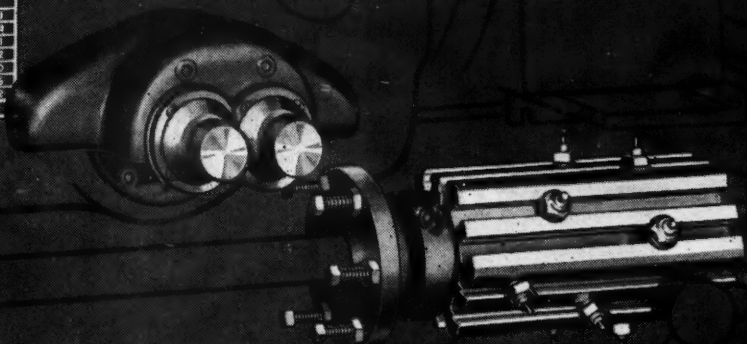
M A C H I N E C O M P A N Y
H A R T F O R D • C O N N E C T I C U T

GISHOLT FASTERMATICS

(AUTOMATIC TURRET LATHES)

NO. BEARS IN VALVE LINES	SPINDLE SPEEDS	
	VALVE DIAL NO. 18.3	POSITIONS NO. 10.4 NR. 28.3
6.50	22	20
6.50	27	50
6.50	33	61
6.50	40	73
6.50	48	87
6.50	57	105
6.50	63	125
6.50	71	150
6.50	80	180
6.50	90	220
6.50	100	276
6.50	110	332

SWT. SIMPLY SPEED ROAD RPH



These simple controls
provide automatic (or
manual) selection of
speeds--to save time
--cut machining costs

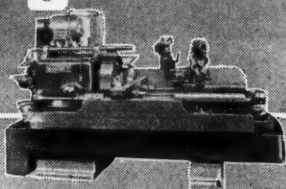
GISHOLT



MACHINE COMPANY, Madison 3, Wisconsin

THE GISHOLT ROUND TABLE

represents the collective experience of specialists in the machining, surface-finishing, and balancing of round and partly round parts. Your problems are welcomed here.

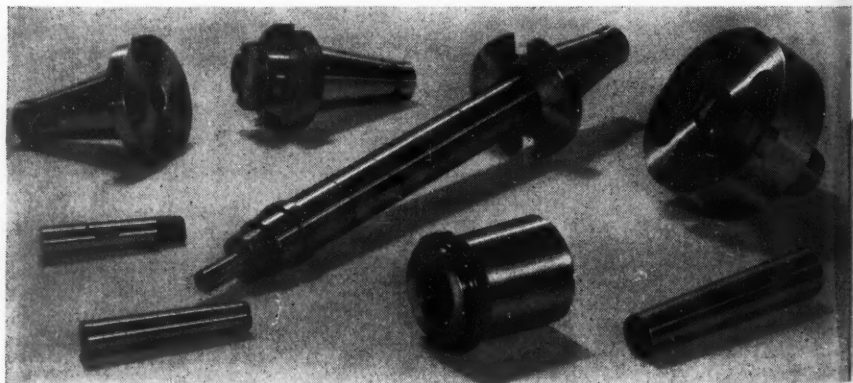


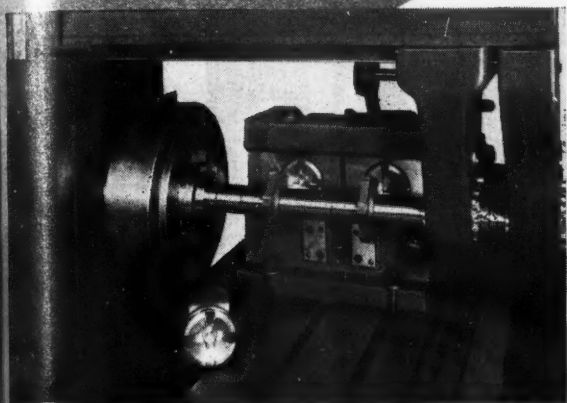
THE FASTERMATICS—Speed changes are effected as buttons in spool contact hydraulic control knobs. Changes may be made automatically at any point during hexagon turret's travel, or manually for convenience of set-up. Various ranges of spindle speeds are available.

turret lathes • automatic lathes • superfinishers • balancers • special machines

TREAT YOUR MILLING MACHINE *to the best!*

● Your milling machine cost a lot of money, so it's only natural for you to expect maximum cutability on all the jobs assigned to it. Perhaps you can't reach the maximum, but you can help by treating your millers to the best in arbors and similar accessories. And you'll not go wrong with CINCINNATI, for they're made with extra special care, starting with chemical analysis of the forging, to the final lapping operation on the ends of the hardened collars. ¶ You have a choice of an exceptionally wide variety of CINCINNATI Arbors, Shell End Mill Arbors, Collet Adapters, Quick Change Adapters, and Spring Chucks and Collets. Several are illustrated below. Complete data on all milling machine arbors and accessories may be obtained by writing for catalog M-1424-2.

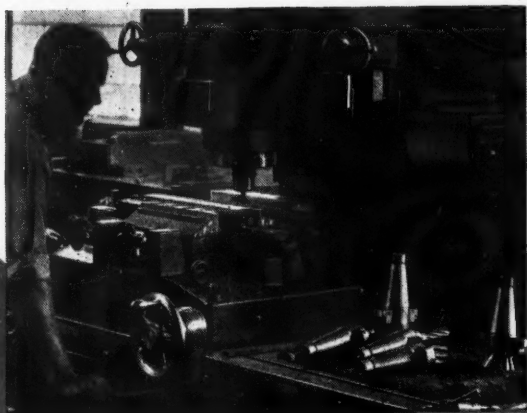




Here a CINCINNATI Arbor is part of the setup for a high speed carbide milling operation. The arbor has to be good to take high speed milling cuts.



CINCINNATI Quick Change Collet and Shell End Mill Arbors enable this operator to use several cutters during one setup.



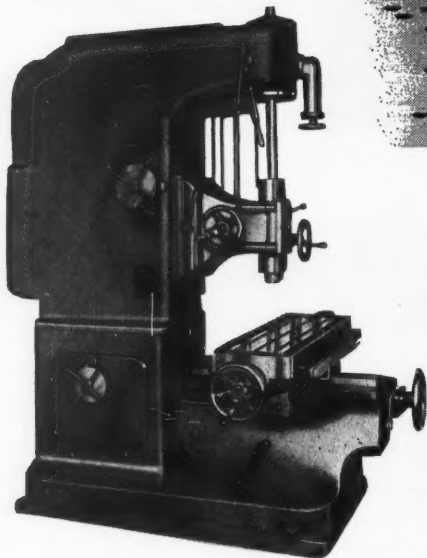
THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO, U. S. A.
MILLING MACHINES • BROACHING MACHINES • CUTTER SHARPENING MACHINES

Fast, Accurate Production
More Economically

with the New

No. 50

PRECISION BORING and VERTICAL MILLING MACHINE



The unusual production economy of the new Knight No. 50 is achieved by combining, in a single solid base machine of exceptional range, all the features required for both precision boring and vertical milling. The elimination of time-wasting extra set-ups and transfers of work save costly labor and make possible much higher output at far lower costs. With a working capacity of greater range than other machines of comparable size, there is also power to spare in the rugged No. 50 for easily and speedily handling the toughest jobs in any shop.

- 16 Spindle speeds from 40 to 2000 r.p.m.
- 9 Spindle feed from .005" to .010"
- 100" per minute table traverse, both directions
- 16 Table feeds, 5/16" to 20" per minute
- 7½ H. P. drive.

*Write Today for
Catalog Information*

W.B.KNIGHT

MACHINERY COMPANY

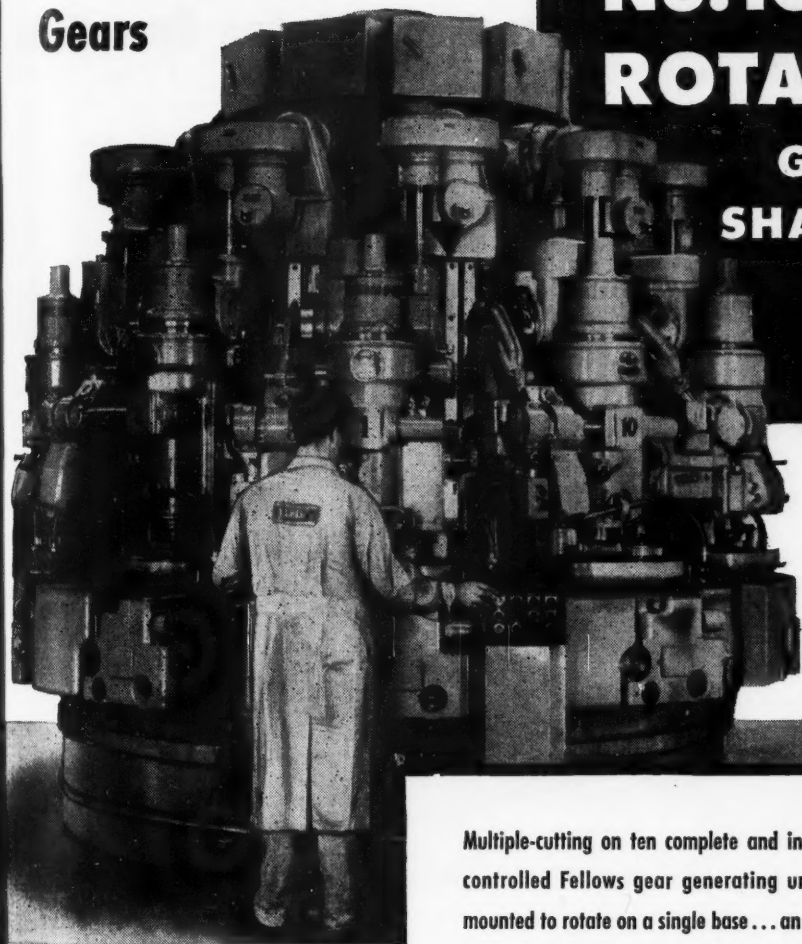


MORE GOODS for MORE PEOPLE at LOWER COST

3920 WEST PINE BLVD. • ST. LOUIS 8, MISSOURI

For Production-Run Gears

No. 10 ROTARY GEAR SHAPER



Multiple-cutting on ten complete and independently controlled Fellows gear generating units, turret-mounted to rotate on a single base... an outstanding new design for heavy cuts at high speed... record production on both internal and external spur and helical gears.

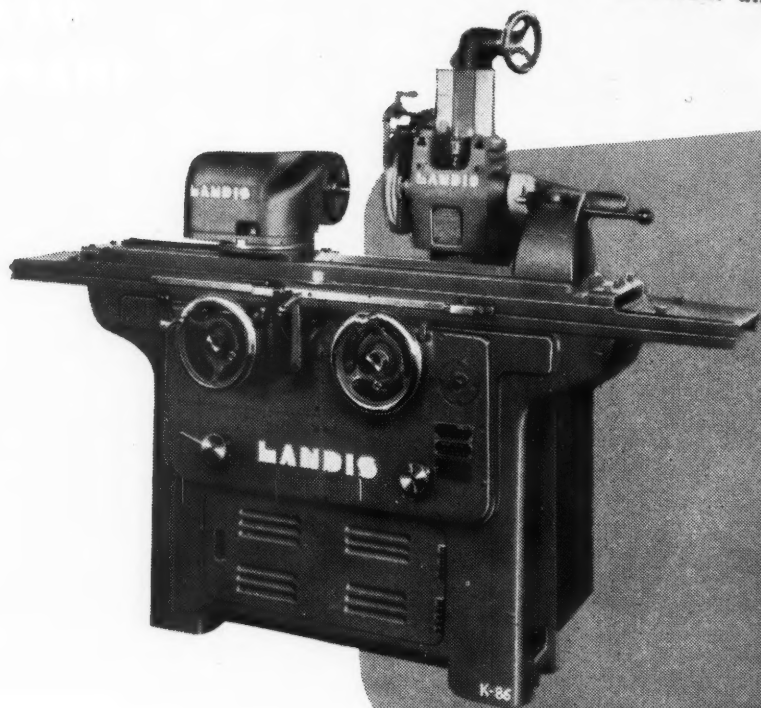
● Write for a new bulletin describing the operation of this remarkable new machine. The Fellows Gear Shaper Co., Head Office and Export Dept., Springfield, Vermont. Branch Offices: 616 Fisher Bldg., Detroit 2; 640 West Town Office Bldg., Chicago 12; 7706 Empire State Bldg., New York 1.

Fellows

MACHINES AND TOOLS FOR ALL OPERATIONS FROM BLANK TO FINISHED GEAR

24 Different Precision Grinding Operations

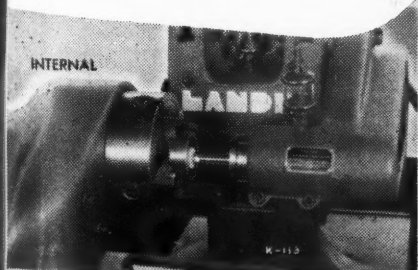
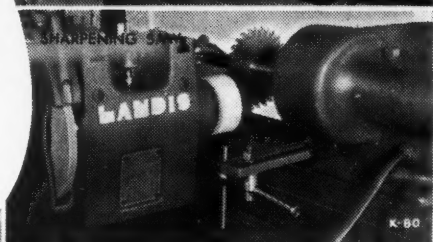
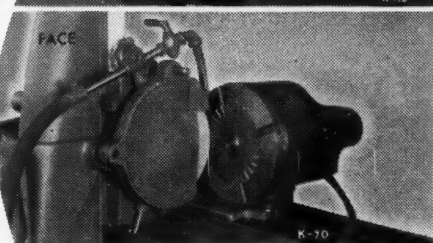
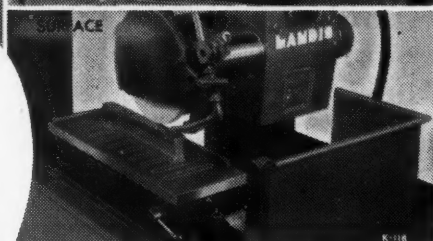
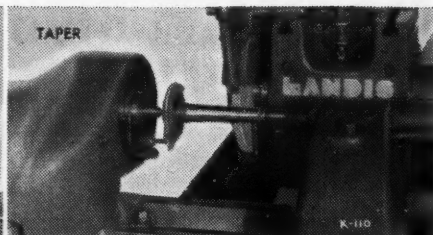
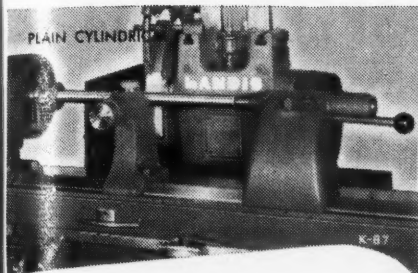
can be done on 12" x 28" universal and tool



LANDIS TOOL
Precision Grinders

for detailed information, request catalog K-45

ions
ool



With Standard Equipment

1. Cylindrical
2. Taper
3. Face
4. Surface (operations without attachments only)
5. Clearance on Saws, Cutters and Reamers
6. Flutes on Taps
7. Face of Teeth on Formed Cutters
8. Spiral Mill Grinding

With Optional Accessory Equipment

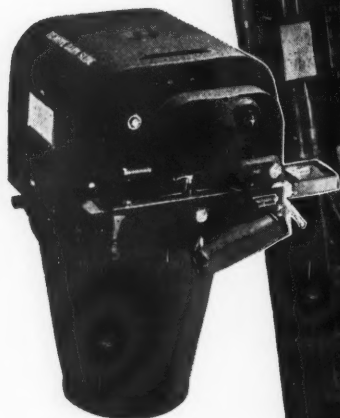
9. Milling Cutters
10. Wet Grinding
11. Dry Grinding
12. Internal Grinding
13. Hobs (right or left hand)
14. Parallel Blocks, Flat Forming Tools and Dies
15. Surface Grinding (quantity lots)
16. Screw Machine and Other Forming Tools
17. Angular Wheel Face
18. Reamers, Taps and Form Cutters
19. Gear Cutter (staggered or straight teeth)
20. Cylindrical Work Requiring Work Rest
21. Face Mills (up to 18 1/2" diameter)
22. End Mills (with taper holding attachment only)
23. Drills (from 3/32" to 1 1/2" diameter)
24. Saws (from 7 1/2" to 26" diameter)

675

LANDIS TOOL COMPANY, WAYNESBORO, PA.

FOSDICK HIGH SPEED DRILLS

**for fast,
accurate
drilling,
reaming,
counter-
boring**



*Photo Courtesy of
Fairchild Camera and
Instrument Corporation*



Fairchild Cameras are precision instruments requiring exceptionally accurate machine work. FOSDICK 6- and 4-spindle High Speed Drills are used extensively for drilling—reaming and counterboring various parts of these instruments.

The battery of 4-spindle High Speed Drills shown are drilling shutter housings for large F-56 camera. These are but a few of the jobs handled by FOSDICK High Speed Drills in this plant. Cases—cones—lens—shutter housings—film magazine parts—all are handled by these high speed drills for precision holes from

0.16 inch to 1 1/4 inch.

The tolerances maintained range from .002 inch for drilling—.0005 inch for reaming and .001 inch for counterboring.

This battery is only one of thousands of FOSDICK High Speed Drills now operating in hundreds of plants producing precision work. Where they have been engaged in war production, they can and are being quickly converted to producing peace-time products.

For full particulars write for the FOSDICK High Speed Drill Bulletin M.S.H.S.

FOSDICK

MACHINE TOOL CO.
CINCINNATI 23, OHIO

TOPS in TAPPING

PERFORMANCE

Jarvis-Dowding

TAPS AND DIES

*Here's the solution
to your tapping problems*

For maximum performance under tapping conditions prevailing in your shop, make your next tap order read "Jarvis-Dowding" . . . custom finished taps, designed to meet your demands. "Jarvis-Dowding" Taps cut more threads with less power, require minimum sharpening, and provide greater dependability on the job. A special hardening process under laboratory control adds a toughness that means longer life. Try "Jarvis-Dowding" Taps and see, feel, and figure the difference."

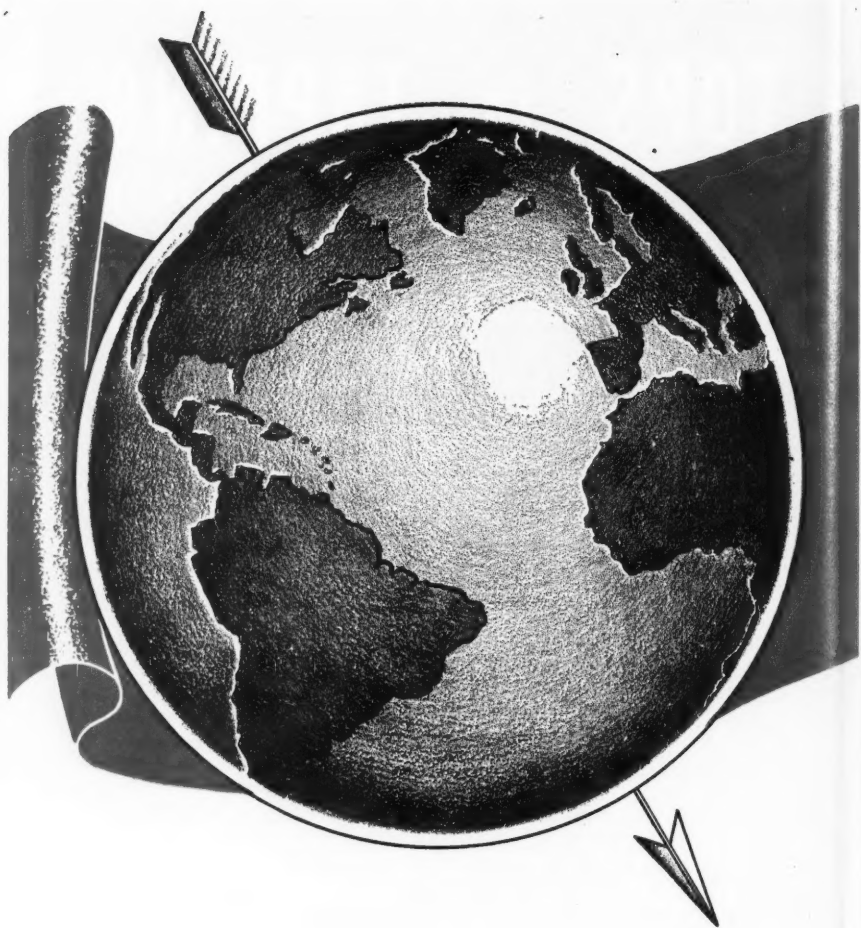
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Jarvis POWER TOOLS

THE CHARLES L. JARVIS CO., MIDDLETOWN IN CONNECTICUT
 Rotary Files • Flexible Shaft Machines • Taps and Dies
 Tapping Attachments • Quick Change Collets and Chucks

November, 1947

MODERN MACHINE SHOP 15



Insist on SIOUX



**STANDARD THE
ALBERTSON & CO., INC.**

The WORLD ACCLAIMS **SIOUX** TOOLS



For production or maintenance you can always depend on SIOUX because it has always had the reputation for building quality tools.

Electric Drills—Bench Grinders

Portable Electric Grinders

Portable Electric Sanders

Portable Electric Polishers

Phenol Abrasive Discs

Grinding Wheels—Flexible Shafts

Wire Wheel Brushes

*Valve Face Grinding Machines, Wet Grinders
(Aviation and Automotive)*

Dual Action Valve Seat Grinder (Automotive)

Dual Action Aviation Valve Seat Grinder (Dry)

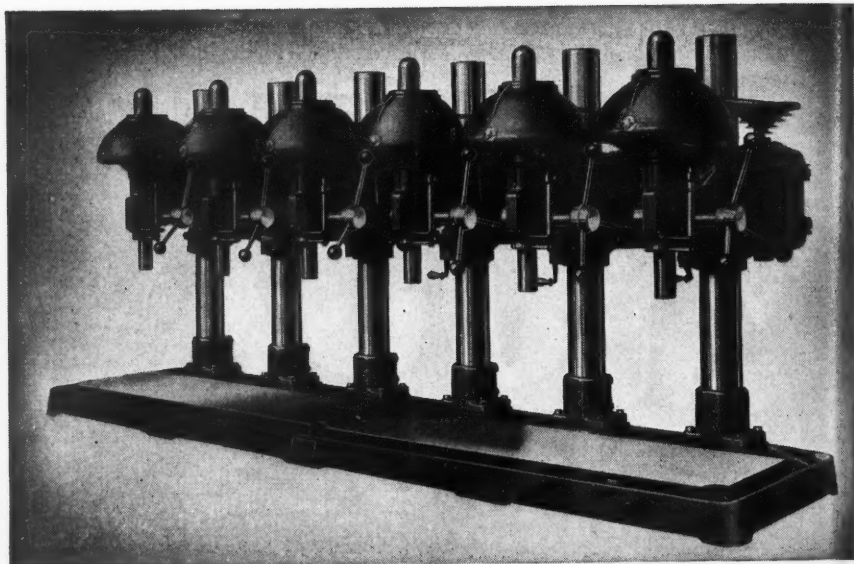
*Wet Valve Seat Grinding Machine for Aircraft
Radial and In-line Motors*

Sold only through authorized SIOUX distributors

Visit our exhibit at A.S.I. Show Booth No's D-54-56-58-60

WORLD OVER
SIOUX CITY, IOWA, U.S.A.





"SEXTUPLETS" FOR Low-Cost-Drilling

This six-spindle arrangement of "Buffalo" No. 18 Drills allows six different setups to operate at once—*fast!* And the sturdy, rigid, accurate "Buffalo" No. 18 Drills handle up to 1" drilling in cast iron! This is just one example of the way "Buffalo" Drills can keep your work MOVING—bring your cost per

**FACTS on lower-cost drill-
ing are yours! Write for
Bulletin 3123-B.**

1000 holes to a very gratifying minimum. And you can have single or multiple spindle drills, floor or bench models, with or without foot feed—according to your need. 50" over-all height.

BUFFALO FORGE COMPANY

388 BROADWAY

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

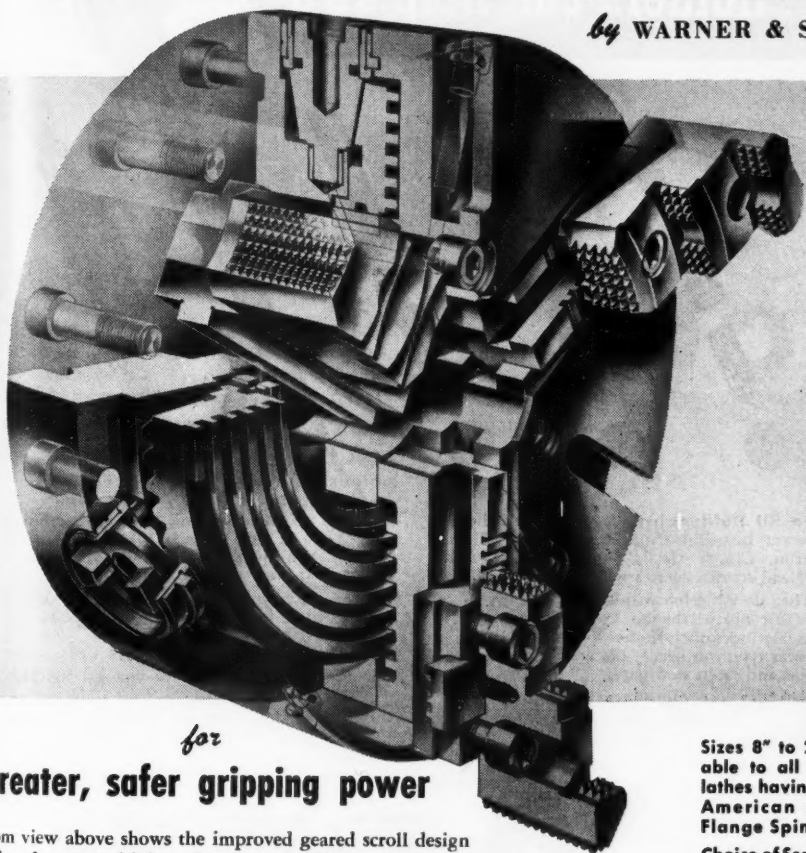
BUFFALO, NEW YORK

"Buffalo"

**No. 18
DRILLS**

Announcing a Complete Line of GEARED Scroll Chucks

by WARNER & SWASEY



for
greater, safer gripping power

antom view above shows the improved geared scroll design
other features which make the new Warner & Swasey
ck so superior for heavy duty, whether operated manually
by a Warner & Swasey power chuck wrench. Alloy steel
ll operates on a large bronze bearing*. Gear teeth of scroll
pinions are generated for greater accuracy and longer
r. Replaceable bronze bushings* support each pinion.

(*Except 8" and 10" sizes which are
not used with Power Chuck Wrench.)

*For full information on this
new chuck line and the many
other new developments in-
troduced by Warner &
Swasey, see your Warner &
Swasey field representative
or write Warner & Swasey,
Cleveland.*

Sizes 8" to 24" adapt-
able to all models of
lathes having Type A-1
American Standard
Flange Spindle Nose.

Choice of Serrated Type
or Tongue and Groove
Type American Stand-
ard Top Jaws.

*You can machine it better, faster,
for less... with a Warner & Swasey*



RRY LATHES, SINGLE AND MULTIPLE SPINDLE AUTOMATICS, PRECISION TAPPING AND THREADING MACHINES

3 Ways Apex Bit Holders can help YOU



Apex Bit Holders have revolutionized the use of power bits and hand drivers for Phillips, Frearson, Clutch Head, Slotted, Socket and Hex Head screws. Here's why:

1. They do a big job with a minimum inventory. Just obtain the bit holders you need (they last indefinitely), then order tips (of whatever type you need), discard the worn out tips and insert new ones.
2. Holders accommodate the short,

money-saving, steel-saving bits in a full range of sizes. Holders furnished for practically all makes of power and spiral drivers.

3. On hex head screws each replaceable, long-wearing socket has two lives. Use one end till it is worn, then turn end for end—and you have a new socket. Catalog No. 20 gives you all the facts. Write for it.

APEX

insert type bits

THE APEX MACHINE & TOOL CO., 1028 S. Patterson Blvd., Dayton 2, Ohio

Safety Friction Tapping Chucks; Quick Change and Positive Drive Drill Chucks; Vertical Float Tapping Chucks; Parallel Floating Tool Holders; Power Bits for Phillips, Slotted Head, Frearson and Clutch Head Screws; Hand Drivers for Phillips and Clutch Head Screws; Aircraft, Industrial Universal Joints; Sockets and Universal Joint Socket Wrenches.

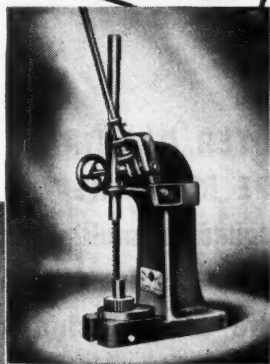
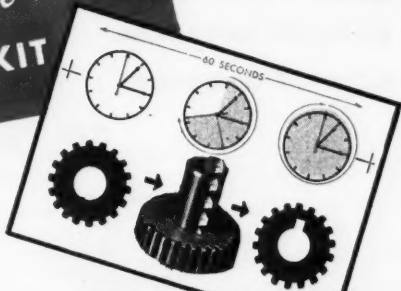
HAND CUT YOURSELF A KEYWAY A MINUTE

In Gears, Pulley Hubs, Couplings, Shafts,
Milling Cutters, etc.

With du Mont's *Minute Man*
KEYWAY BROACH KIT

Think of the time and trouble and money you'll save when you have this Minute Man Kit handy to cut keyways of any standard width, any depth. A few keyways jobs and the Kit has paid for itself.

Here's a set of fine tools that no shop can afford to be without. Deliveries are now being made from stock. A postcard with your name and company address will bring you the name of the nearest Mill Supply Distributor and a free copy of the new Minute Man Catalog, Price List and Reference Manual "S."



The du Mont Arbor Press is ideal for keyway broaching and other shop uses. It comes in sizes for 2, 3, and 5 ton pressure.



Kit contains everything you need to cut up to 32 different size keyways—precision broaches, bushings, shims, keyway stock.

The du MONT CORPORATION

GREENFIELD, MASSACHUSETTS

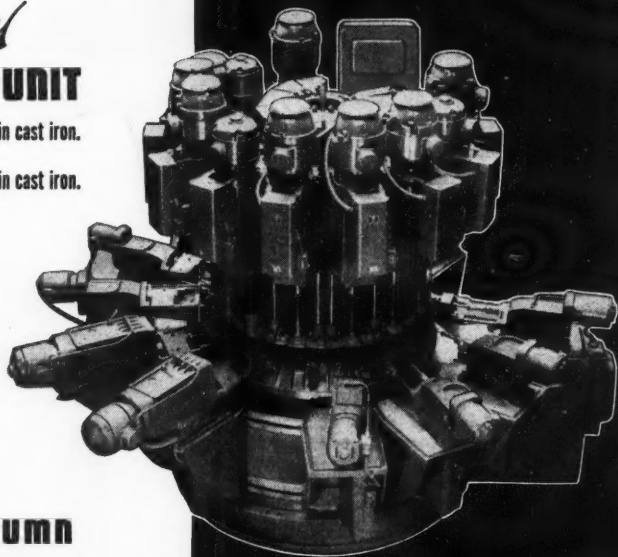
Avey Automatic

METHOD No. 9

**THE *Avey*
CAM FEED UNIT**

No. 1 Size—1/2" capacity in cast iron.

No. 2 Size—7/8" capacity in cast iron.



**CENTER COLUMN
TYPE MACHINE**

designed for multiple operation on two faces of work, where work includes too many holes or operations to be performed by center rotating table methods: (drilling—reaming—tapping).

METHOD No. 9 — Multiple tooling with tools accessible. Machines usually furnished in pairs, or with double fixtures at each indexing position, so that top and one side of work can be presented at one time, while bottom and opposite side can be presented in second position or on second machine.

Send for
Engineering
Bulletin
No. 645

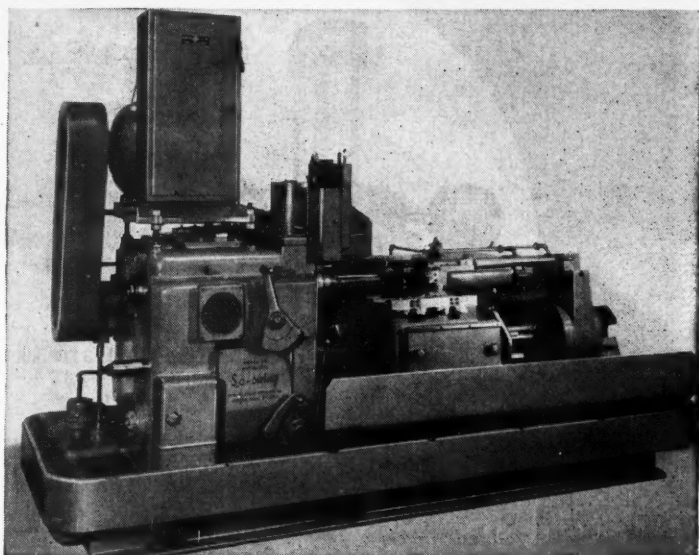


THE AVEY DRILLING MACHINE CO.
CINCINNATI • OHIO • U.S.A.

MACHINE OF THE MONTH

PREPARED BY THE SENECA FALLS MACHINE CO. "THE Lo-swing PEOPLE" SENECA FALLS, NEW YORK

Illustration shows machine equipped with two-slide front carriage, back squaring attachment and third arm facing attachment.



MODEL AR Lo-swing LATHE FEATURES INSTANTANEOUS TOOL RELIEF CONTROL

● Foremost of the improved features and refinements which distinguish this newest Lo-swing Automatic Lathe is its instantaneous tool relief control mechanism which reduces tool breakage and down time. In case of breakage of any carbide tipped tool, the operator merely pushes a control lever which reverses rotation of the feed mechanism. Carriages and slides automatically return to starting position without disturbing timing of the slides or adjustment of the tools.

Model AR also is equipped with the Seneca Falls SIMPLIFIED CHANGE-OVER MECHANISM. All cams may be pre-set to graduated dials for desired length of cut—eliminating

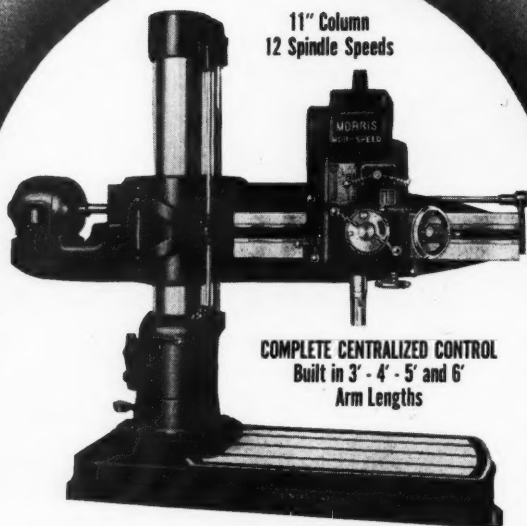
loss of time through the old cut and try method. Other features include a new type front carriage which facilitates loading and unloading of parts, and a new type pan which considerably increases chip capacity and simplifies chip removal.

In capacity, Model AR is between the Model LR and Model R-14 Lo-swing lathes. It incorporates all the proven advantages of positive cam operation and offers a flexibility never before obtained in a 100% mechanically-operated lathe. It is designed to take full advantage of the fast cutting speeds possible with carbide tools. Bulletin No. AR46 will be sent on request.

SENECA FALLS MACHINE CO., SENECA FALLS, N. Y.

PRODUCTION COSTS ARE LOWER WITH Lo-swing

MORRIS *Mor-Speed* RADIALS



Mor-Speed Radials are of rigid construction to meet the demand for fast, economical drilling, boring, reaming, facing and tapping. Automatic lubrication plus the use of the finest materials and correct design assure long, carefree life.

EASY TO OPERATE CENTRALIZED CONTROL—All speed and feed changes are located in the head. All changes are instantly made from operator's normal working position.

INDEX PLATES are direct reading. They are placed directly at speed and feed change levers.

DIAL DEPTH GAUGE is graduated and has direct-reading plate for setting drills to compensate for drill points.

THE HEAD CLAMP is located on the side of the head and clamps the head absolutely tight to the arm.

ELEVATING MECHANISM is built into the rear of the arm, is fully enclosed and entire unit is anti-friction mounted and runs in oil. Arm elevation is controlled by a separate ball bearing motor with reversing drum switch. It is connected to the revolving elevating nut which operates on a stationary elevating screw.

WRITE FOR COMPLETE DESCRIPTIVE BULLETIN.



The MORRIS Machine Tool Co.
CINCINNATI 3, OHIO



CUT-OFF WHEELS

The "AMERICAN" *Ripper* Cut-off wheel speeds through hard or soft materials — lasts longer — takes deep cuts without binding or heating. Designed with the slight "set" of a rip saw, the wheel maintains proper clearance for the keen "AMERICAN" abrasives to give top performance on portable tools or cut-off machines. Write for information.

Now available in 6", 8", 10", 12", 14" diameter, (thicknesses, 3/32" and up); 16" diameter, (thicknesses, 1/8" and up).

AMERICAN EMERY WHEEL WORKS

2 RICHMOND SQUARE, PROVIDENCE 1, R. I.

A Single Investment that



No. 36 with adjustable
cutterhead in hori-
zontal milling position.
Table: 64 x 14 inches

Van Norman Ram Type Millers are available in 7 Sizes — 18 Models.
A Size and Model for every milling requirement.

"It pays to Van Normanize"

Pays for Itself 3 ways ...

VAN NORMAN Ram Type Milling Machine

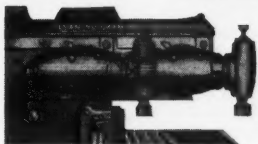
The Van Norman Ram Type Milling Machine quickly pays for itself through time saved in set-ups, elimination of idle machine time and increased production. Not only does it perform conventional horizontal, angular and vertical milling, but it enables operators to carry most jobs through to completion without work reset-ups.

The Van Norman Ram Type Miller is available in many models... a machine to fit every requirement in the tool room, machine shop, pattern shop, laboratory or production department.



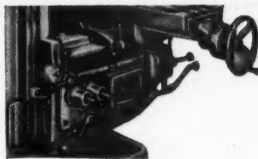
1. Adjustable Cutterhead

permits conventional horizontal, vertical, as well as angular milling with standard arbors and cutters. This feature reduces set-ups, eliminates idle operator and machine time because there is no waiting for single purpose machines.



2. Moveable Ram

on which the cutterhead is mounted, in combination with the saddle cross-feed, increases the versatility and capacity of the ram type miller. This feature permits the operator to handle larger and unusual work pieces with relative ease and minimum set-ups.



3. Ease of Operation

and convenience of control speed-up milling operations. All power controls, on all machines except smaller models, are located at both front and rear. Dual controls of power feeds reduce worker fatigue, provide maximum safety. These controls are directional—operate in the direction of desired table, saddle and knee movement. These and other features make the Van Norman Ram Type Miller the most versatile, cost cutting machine available. Write for information.

VAN NORMAN COMPANY
SPRINGFIELD 7, MASSACHUSETTS





The Hardest Possible Metal Sawing

... cutting off test specimens in the Metallurgical Laboratory of this giant steel plant. There is no time for pampering here. Each saw must handle anything that comes, as it comes—the hardest steels and toughest alloys, in all degrees of hardness—in any size, any form or condition—because each heat, each drawing, and each forming run has to be tested.

The steel mill where these pictures were taken reports that these saws have been operating 24 hours, 7 days a week for the last five years. Maintenance cost has been practically non-existent. Furthermore, the efficiency of these saws has made possible the elimination

of an equal number of other sawing machines in the department.

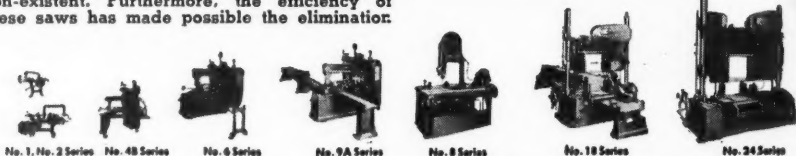
The answer to your cut-off problem, whether large or small, will be found in our new C48 catalog. The services of our field engineers are also available in every locality. Send for either or both now.

ARMSTRONG-BLUM MFG. CO.

"The Hack Saw People"

5700 Bloomingdale Ave.

Chicago 39, U.S.A.



No. 1, No. 2 Series

No. 4B Series

No. 6 Series

No. 9A Series

No. 8 Series

No. 10 Series

No. 24 Series

MARVEL *Metal Cutting* **SAWS**
Better Machines—Better Blades

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Made of Chrome Steel

OVER 5,000 SHAPES
SIZES AND CUTS

Where precision and accuracy is required,
GROBET—the oldest name in files—assures
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FILES are in use than all other makes where
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Buy GROBET and get the file you need for
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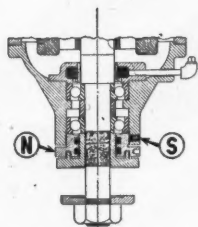
IMPORTERS OF GROBET SWISS FILES

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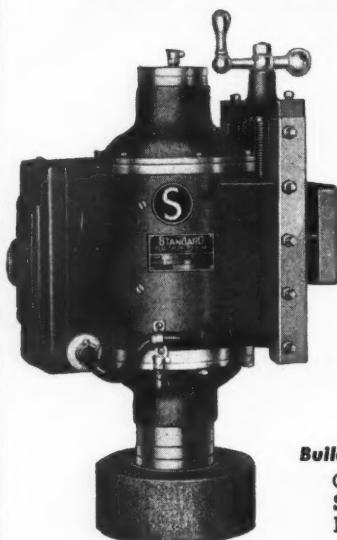
Plants: New York • Chicago • Los Angeles

STANDARDIZE WITH STANDARD

This sectional view illustrates a creation of STANDARD engineers—evidence that you receive more when you buy a STANDARD tool. Sectional view of thrust bearing construction on all STANDARD modern Vertical Spindle and Double End Disc Grinders.



Threaded Nut "N" permits fractional thousandths adjustment by releasing Set Screw "S" to take up wear on bearings without removing disc plate—no shims involved.



TYPE PAV
With Vertical Feed

The STANDARD Vertical Spindle Grinder is made in sizes from $\frac{1}{2}$ H.P. to 15 H.P. Speeds of 1150, 1750 or 3450 r.p.m. for cup or plate mounted cylinder type of wheel. Suitable for application to Planer, Boring Mill or special purposes.

Write for details.

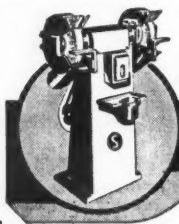
Builders of the STANDARD:

GRINDERS: Tool post, Internal, Die, Disc, Tool, Snagging, Wet tool, Carbide tool, etc. Sizes $\frac{1}{2}$ H.P. to 50 H.P.

BUFFING AND POLISHING MACHINES: Sizes $\frac{1}{2}$ H.P. to 60 H.P. "Speedial" control with infinitely variable speed 1500 to 3000 r.p.m.

SPEED AND CHUCKING LATHES.

COMPLETE CATALOG ON REQUEST



The **STANDARD ELECTRICAL TOOL Co.**

CINCINNATI - 4 - OHIO

2487 RIVER ROAD



THE NEW AIR-OPERATED ALLEN DIAL FEED TABLE

**Solve That SPECIAL Production Problem
with our STANDARD Feed UNITS**

**For use with PUNCH PRESS, DRILL PRESS,
PRODUCTION MILLER, SPOT WELDER, etc.**

Recommended for assembling, punching, machining of nuts, stampings.

MODEL A— A 3-way valve, actuated by some motion from the machine to which the table is to be synchronized, allows compressed air to move a hardened and lapped piston to operate the Pawl arm. The Pawl indexes the plate and LOCKS it in the indexed position until the valve is released allowing a spring to return the Pawl, ready for the next indexing.

Model A is available in two sizes:

No. 7 $\frac{1}{4}$ -A, —7 $\frac{1}{4}$ " Index Plate, 9" Base, 2 15/16 overall height—\$125.00

No. 11-A, — 11" Index Plate, 14" Base, 4" overall height — 175.00

Special Index Plates available with from 8 to 40 notches. 12-position is standard.

MODEL B— An adaptation of Model A wherein a special control valve is incorporated so that the plate is automatically self-indexing. By merely turning a screw speed is adjustable from one indexing each half second to one each ten seconds. The table is locked in position between indexings. Recommended for soldering, assembly, etc., where no mechanical motion is available.

Model B is available in two sizes:

No. 7 $\frac{1}{4}$ -B, (specifications same as Model 7 $\frac{1}{4}$ -A)—\$155.00

No. 11-B, (specifications same as Model 11-A)— 205.00

ACCESSORIES— Specially designed and made for use with Allen Dial Feed Tables.

- Air-operated down clamps and side clamps with 4X power factor are available for holding the work piece.
- Knockout for ejection of the work piece from the index plate.
- Special 2- and 3-way valves to synchronize the clamps and knockout with the table motion thereby tremendously increasing the versatility of operation.

We invite inquiries concerning your special problems. Our engineering department is ready to cooperate with you.

*Write for
illustrated brochure.*

Prices F.O.B. Brooklyn, New York

Manufactured by

The A. K. ALLEN COMPANY

3011 Ft. HAMILTON PARKWAY • BROOKLYN 18, N. Y.

Unique

RESILIENT RUBBER
in Brightboy's combination with
abrasive, gives

A WIDE VARIETY OF SURFACE EFFECTS ON

- METALS
- PLASTICS
- WOOD

Economical

Simultaneously
**BURRS, FINISHES,
SMOOTHS, POLISHES**

Brightboy

Bridges the gap be-
tween the grind and buff

IN ONE OPERATION

See what Brightboy will do in
your conventional and special
finishing!

- Ask your dealer for the Brightboy catalog-manual and prices. Write for a Brightboy service engineer to call with production-planning suggestions and methods ideas.

BRIGHTBOY INDUSTRIAL DIVISION
Weldon Roberts Rubber Co.,
Newark 7, N. J.



WHEELS • BLOCKS • RODS • TABLETS

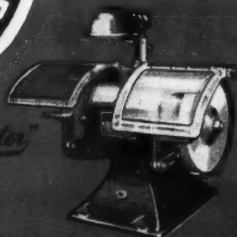
*The Soft Rubber Binder
Cushions The Abrasive*

*For
One Operation, Close-Tolerance Finishing*

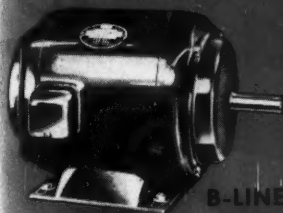
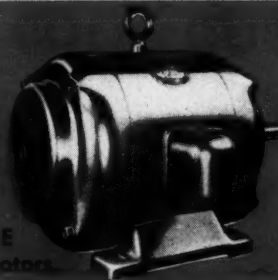


MOTORS & GRINDERS

B-LINE
"Toolmaster"
BENCH
GRINDERS



B-LINE
Motors



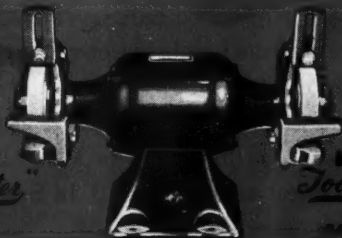
B-LINE
Motor

FOR LASTING MOTOR SATISFACTION TRY B-LINE—THE STANDARD OF QUALITY SINCE 1925. Standard motors from 1/6 to 30 H.P., also Condenser and Gear Head Motors, and motors for special applications.—Remember there's a B-Line Motor for every job.

B-LINE "TOOLMASTER" GRINDERS—A complete line of Bench and Pedestal Type from 1/4 to 5 H.P. ratings—Every B-Line product is GUARANTEED and backed by Coast-to-Coast Service.



B-LINE
"Toolmaster"
PEDESTAL
GRINDERS



B-LINE
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BENCH
GRINDERS

WRITE FOR
GRINDER BULLETIN
No. 7000
MOTOR BULLETIN
No. 5000

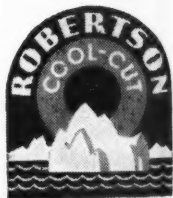
THE BROWN-BROCKMEYER COMPANY

PLANTS AT DAYTON, WILMINGTON, WASHINGTON AND XENIA, OHIO

GENERAL OFFICES, DAYTON 1, OHIO

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Burdened down with
"loaded" wheels? ..



? .. use a ROBERTSON COOL-CUT

MANY GRINDING WHEELS lose their effectiveness when they become "loaded," or filled in with bits of metal. A Robertson Cool-Cut Wheel, with its revolutionary open structure and its "clawing" action, uses only a few cutting grains at one time. The spaces in between are available for chip clearance. That is why a Robertson resists loading more than a conventional wheel. The results: cool cutting, even on the hardest metals—accurate, fast production—and lowered grinding-costs.

Hard to believe? Then take the experience of this manufacturing plant in Philadelphia: Grinding rivets from drop forgings on a centerless grinder, they were getting only 25 rivets per wheel-dressing, taking off $\frac{1}{16}$ " stock on a plunge cut. When a Robertson SA 54-QV wheel was substituted on the same job, production was increased to 125 rivets per wheel-dressing . . . an increase of 400%!

This is typical of the results reported by users of Robertson Cool-Cut Wheels. Whether you are doing surface grinding, internal grinding or cylindrical grinding . . . whether the material you are working is steel, cast-iron or bronze . . . you'll find that a Robertson Cool-Cut Wheel will substantially increase your production and at the same time lower your grinding costs.

ROBERTSON MANUFACTURING COMPANY **TRENTON 5, NEW JERSEY**

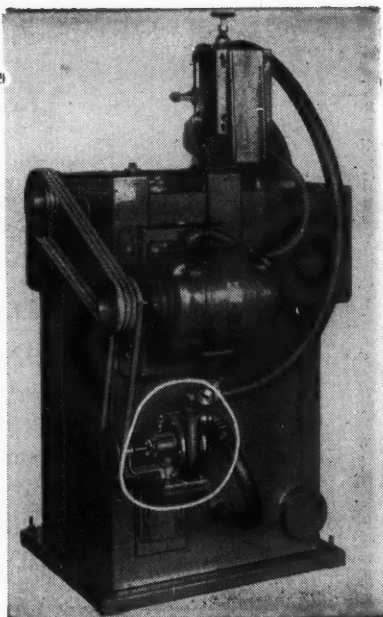
Manufacturers of Vitrified-Bonded Grinding Wheels • Mounted Wheels • Segments



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HEAT-CONTROL
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THE strictest control you can install . . . unvarying, uniform, constantly on the alert to keep work and tool at the proper temperature. And a dependable, alert piece of equipment to keep costs down and quality at its peak.

FULFLO COOLANT PUMPS with their precision design, engineering and construction are available for practically every type of industry. Standard or special models. Pipe sizes $\frac{3}{8}$ " to $1\frac{1}{2}$ ". Motor, direct or belt drive.



Write on your letterhead for **FULFLO MECHANICAL
DATA BOOK.**



Specialties Co., Inc.
BLANCHESTER, OHIO

CUT AWAY EXCESS METAL...

FASTER

with

Thor

**PNEUMATIC
GRINDERS
AND SANDERS**

Plenty of power and speed—teamed with smooth, dependable operation—gets more work done in less time—with top accuracy. Thor Grinders and Sanders handle all types of metal removal with maximum economy. Full range of sizes—in speeds from 3,000 to 20,000 r.p.m.

Call your nearby Thor branch for a demonstration.

INDEPENDENT PNEUMATIC TOOL COMPANY

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Thor **PORTABLE POWER
TOOLS**

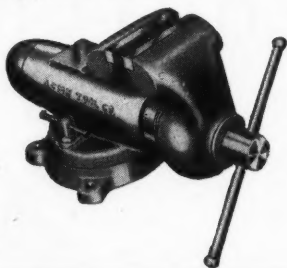
**PNEUMATIC TOOLS • UNIVERSAL AND HIGH FREQUENCY
ELECTRIC TOOLS • MINING AND CONTRACTORS TOOLS**

ACME BENCH VISES

PRACTICAL DESIGN • STURDY CONSTRUCTION

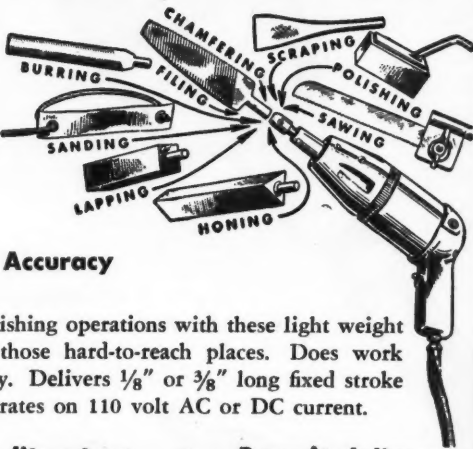
These light or heavy duty vises are being used in more and more factories, because of these outstanding features:

Greater Holding Power
Unbreakable Sleeve Nut
Totally Enclosed Body
Precision Built
Practically Indestructible
Interchangeable Ground Jaws
Made in 11 Sizes from 2" to 6"



RECIPROCATING TOOLS PORTABLE ELECTRIC

In and Out Action •
Uniform Stroke •
Uniform Work • Unusual Accuracy



Speed up your hand filing or finishing operations with these light weight reciprocating tools. Gets into those hard-to-reach places. Does work quickly, accurately and uniformly. Delivers $\frac{1}{8}$ " or $\frac{3}{8}$ " long fixed stroke at 1000 strokes per minute—operates on 110 volt AC or DC current.

Write for literature • Prompt delivery



ACME TOOL COMPANY

69 WEST BROADWAY

NEW YORK 7, N. Y.

FINE INCREMENT SPEED CONTROL—

Multi-point, fine increment motor rheostat controlled from operators position, eliminates compromise speed settings, inevitable with conventional gear changes. Exact cutting speed assures maximum production.

TAILORED TABLE SPEEDS—

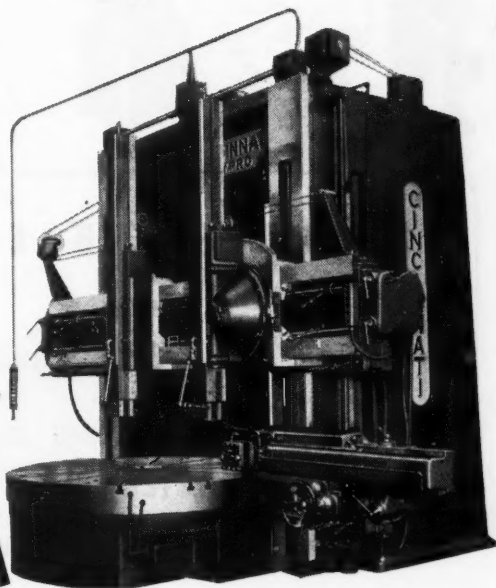
On work of varying diameter table speed may be continuously adjusted for maximum production, without stopping table, without shifting gears and while tools are cutting.

SET UP TIME REDUCED—

Fine increment table inching control in forward and reverse directions with dynamic braking.

OPERATOR'S FATIGUE ELIMINATED —

Complete control of all motors from single accessible pendant station, plus absence of table clutch and brake shifting lessens operator's fatigue.



Effortless Control
COMES WITH
CINCINNATI
HYPRO
SPEED CONTROL

CAN NOW BE FURNISHED ON ALL HYPRO
BORING MILLS IN FOLLOWING SIZES:

54"—64"—6'-7'.
7' widened to 8'. 8'-10'-12'
12'-16' Extension type.

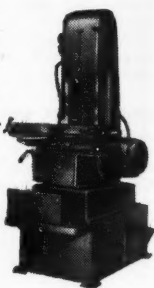
THE CINCINNATI HYPRO PLANER COMPANY
PLANERS · BORING MILLS · PLANER TYPE MILLERS
CINCINNATI, OHIO



B6W—Quickly adaptable to flat, curved or irregular pieces. Various shaped platens form the flexible abrasive belt to fit many shapes of work.



WG4—For production runs on small parts, fed freehand or by simplest fixtures. Gives final finish to jobs done on automatics, band and hacksaws, lathes, millers, etc. Grinds carbide tipped tools.



PORTER-CABLE

WET-BELT

Abrasive Machining

**DOES MORE SURFACING JOBS
FASTER AND BETTER**

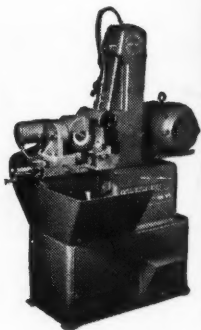
What it is—High speed cutting by millions of strong abrasive points firmly imbedded in a continuous belt, kept cool and clean by regulated bath of water or other coolants.

What it does—Porter-Cable wet-belt machining does close-tolerance work on flats, squaring, cylindrical surfacing . . . Also deburrs, knocks off corners, forms radii, bevels . . . performs numerous other material-removing and finishing operations.

How it increases your profits—Frequently ten times faster on many operations done by millers, shapers, wheel grinders. Saves 75%-90% in set-up time. Eliminates wheel dressing, truing, and balancing in centerless grinding.

METHODS AND TOOL ENGINEERS!
Send us drawings or sample pieces of your work. Our engineers, long-experienced in wet-belt machining, will make recommendations without cost or obligation. Send for our film: *Machine of the Age*. Loaned without charge.

Model BG8 (with automatic feed table)—a precision surfacing machine for repeat operations. Eliminates expensive fixtures. 8" wide belt works on entire areas at once. Quickest method on interrupted areas.



L-4 — Centerless belt grinder. Eliminates truing, balancing and continuous wheel dressing. Handles different size stock from 3/36" to 2 1/4" dia. Continuous feed.

PORTER-CABLE
MACHINE COMPANY
300-11 Wolf St. Syracuse 8, N. Y.



HOW TO GIVE YOUR AIR POWER A SHOT IN THE ARM

THE new Rotor Needle Type Tester detects these culprits that choke off air pressure before it reaches your tools:

Loss due to inadequate size of pipe and hose.

Loss due to restrictions such as dirty strainers and hose menders.

Loss due to leaking couplings.

It's easy to use this Rotor Tester. Simply bend

the hose at the tool and stick in the needle. The gauge indicates pounds of pressure at that point *while the tool is under full load*. If it's below par (80-90 pounds), track down the cause or call in the Rotor Application Engineer for advice.

Ask for details about this new Rotor Tester today!

AIR O'TOOL

AIR

THE ROTOR TOOL CO.

CLEVELAND, OHIO

**HIGH
CYCLE**

UNBIASED ANALYSIS OF PORTABLE TOOL PROBLEMS

EXTRA WEIGHT-SPEED-CAPACITY IN THIS MODERN-DESIGNED CUT-OFF TOOL

ONE LOOK at the Johnson Band Saw tells you that it is designed on up-to-the-minute machine tool lines —

For instance, the **THREE POINT SUPPORT** — three heavy, box section legs which make the most uneven floor as level as a toolmaker's surface plate. Wide span at rear gives full stability — single leg at front is out of operator's way. The **BROAD, DEEP BED**, immune to distortion. The **QUICK-ACTING VISE**, instantly adjusted to the job without reaching. The **BOLT-ACTION STOCK STOP** for duplicate lengths.

Note too, the **HEAVY, STIFF BOX-SECTION GUARD** and running gear sup-

port. The **LARGE 16" BAND WHEELS** which allow extra capacity with little twist of saw blade. The **GENEROUS CAPACITY** — 10" HIGH, 18" WIDE — enough for almost any cut-off job, on any shape work. The **HYDRAULIC FEED CONTROL** which, with the quick-adjustable slide weight, maintains correct blade pressure. The **EXTRA THIN BLADE** — .032" — which removes less stock, and does it faster and more accurately.

These are just a few of many exceptional features that are everywhere proving the profit-making qualities of this machine.

The JOHNSON METAL CUT-OFF BAND SAW

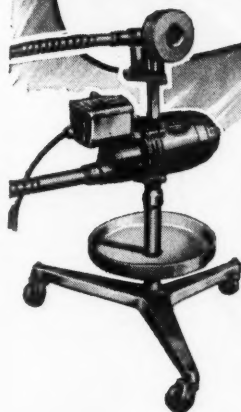


Wet cutting attachment available — also casters for quick portability. Complete details in catalog just off the press. Write.

JOHNSON MANUFACTURING CORP.
620 CHRYSLER BLDG.,
NEW YORK 17, N. Y.

OPERATORS HANDLE...

**Less Weight
More Power**



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REG. U.S. PAT. OFF.

FLEXIBLE SHAFT

GRINDER



As the motor is mounted on an easy-rolling floor stand or overhead trolley, the working tools on a Mall Flexible Shaft Grinder are lighter in weight, more compact, more comfortable to hold, easier and less tiresome to handle. This means fewer rest periods—more time on the job. Spots can be reached that are inaccessible to heavier, more cumbersome self-contained motorized tools. More than this, every Mall motor is dynamically balanced at the factory to assure true concentric motion in the tool. Attachments for Grinding, Disc Sanding, Wire Brushing, Buffing, Polishing and Drilling are interchangeable. Available in 3 H.P. Geared Head—4500 r.p.m.; $\frac{3}{4}$, 1, $1\frac{1}{2}$ H.P. Direct Drive—3450 r.p.m.; and $\frac{3}{4}$ H.P. Counter-shaft models—1650 to 7400 r.p.m. All with tilting, swiveling, dustproof electric motors.

Ask your Supplier or write Power Tool Division for literature.

MALL TOOL COMPANY

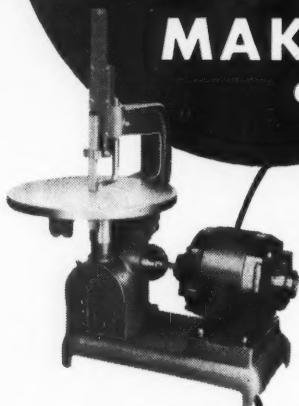
7814 South Chicago Avenue

Chicago 19, Illinois

26 Years of "Better Tools For Better Work"

Beat

HIGH COSTS OF DIE MAKING

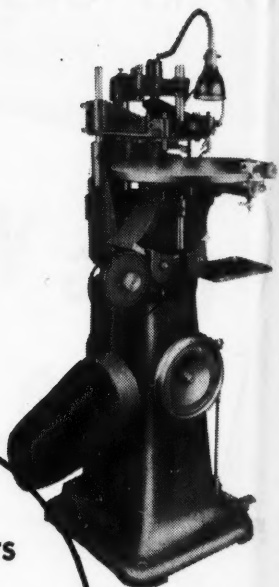


The Bench Type

Extremely accurate for sawing, filing, and lapping tool steels up to 1" thick . . . 8½" throat permits working to center of 17" circle . . . 11" table tilts 10 degrees right, left and forward. (Special overarm available for greater capacity.)

CUT LABOR COSTS 50 TO 60%

The Oliver Die Making Machine reduces costs of expensive dies, gages, template and cams. You do not need a skilled mechanic to operate—It's faster and more accurate than ordinary methods.



Heavy Duty

This machine will saw and file metals up to 3" thick. Sawing can be handled up to 20" circle. 100 to 300 strokes. The 18" table tilts 15 degrees to front, left or right and 3 degrees to back. Constant controlled pressure feed. NO WORK SPOILAGE.

**OLIVER
OF
ADRIAN**

PRODUCTS

**OLIVER
INSTRUMENT CO.**

1430 E. Maumee St.
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IMPROVE YOUR TOOLROOM
IT'S THE BACKBONE
OF PRODUCTION

**OLIVER
OF ADRIAN**

AUTOMATIC DRILL GRINDERS
TOOL & CUTTER GRINDERS—DRILL
POINT THINNERS—TEMPLATE
TOOL GRINDERS—FACE MILL
GRINDERS—DIEMAKING MACHINES

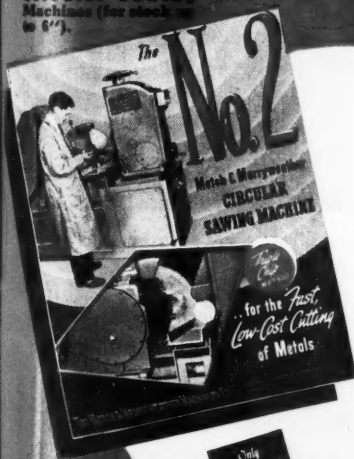
3 New MOTCH & MERRYWEATHER Bulletins



Ask for this new 16-page bulletin on the entire line of Motch & Merryweather Circular Sawing Equipment.

Write for this new 12-page bulletin on Motch & Merryweather No. 2 Circular Sawing Machines (for stock up to 6").

Get this revised 12-page bulletin on Motch & Merryweather No. 33 Circular Sawing Machines (for stock up to 24").



Only
TW & MW build
ALL 3:
CIRCULAR SAW
SAW BLADE
BLADE GRINDER

Here are three new bulletins for your circular sawing "library". In them you will find valuable information stemming from an unparalleled experience in this field. Only Motch & Merryweather offers you this background — derived from many years spent in building "all 3": the Triple-Chip Saw Blade, the circular sawing machine that uses it, and the blade sharpener that gives it the proper tooth contour. Get details now about the Triple-Chip Method, which has a remarkable knack for bringing cut-off costs away, 'way down.

THE MOTCH & MERRYWEATHER MACHINERY CO.
FENTON BUILDING CLEVELAND 13, OHIO

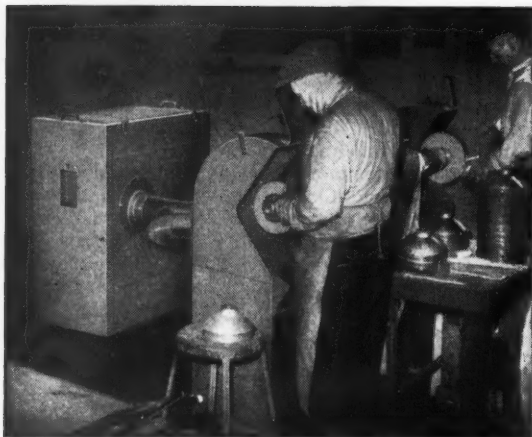
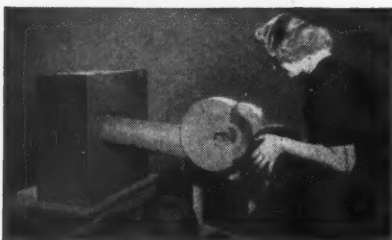
AT YOUR COMMAND • AN UNPARALLELED EXPERIENCE IN CIRCULAR SAWING

STOP DUSTS



With Low Cost Individual **DUSTKOPS**

All types of dusts are stopped by Dustkops: Dusts from Grinders, Polishers, Buffers, Sanders (belt and disc), Abrasive Cut-offs; Woodworking Equipment; Fumes from Degreasers; Vapor from Screw Machines and Thread Grinders all can be stopped with least cost by **DUSTKOPS**.



*Send for 16-page catalog
and recommendations for
your dust problem.*

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✓ **LOWEST COST**
✓ **HIGHEST QUALITY!**

**NEW
CHIP BREAKER
GRINDER**

by
Hammond
OF KALAMAZOO

Here's the answer to your chip breaker grinding problem. No longer is it necessary to tie up expensive grinding equipment or put up with slow makeshift methods to grind chip breakers. The HAMMOND Model C-4 is low cost — precision built — and especially designed for carbide chip breaker grinding. Note these features:

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- Fully Protected — Moving parts protected from grit and sludge
- Easy operating Reciprocating Table
- Heavy Machine Tool Construction

Available in bench model (\$295.00) or floor model (\$330.00). Prompt shipment. WRITE FOR CATALOG.



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Hammond Machinery Builders
INC.

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PRECISION
BALL BEARING
CONSTRUCTION**

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ROTARY BUSHINGS

**FOR DRILLING, CORE DRILLING,
ROUGH AND FINISHED BORING**

The inner race of the GATCO bushing rotates with the tool, piloting the tool accurately below or above the work—or both.

Eliminates expensive tool construction—Reduces tool wear—Prevents seizure and pilot breakage—Especially adapted where precision is required.

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GIERN & ANHOLTT TOOL CO.
1304 Mt. Elliott Avenue • Detroit 7, Michigan

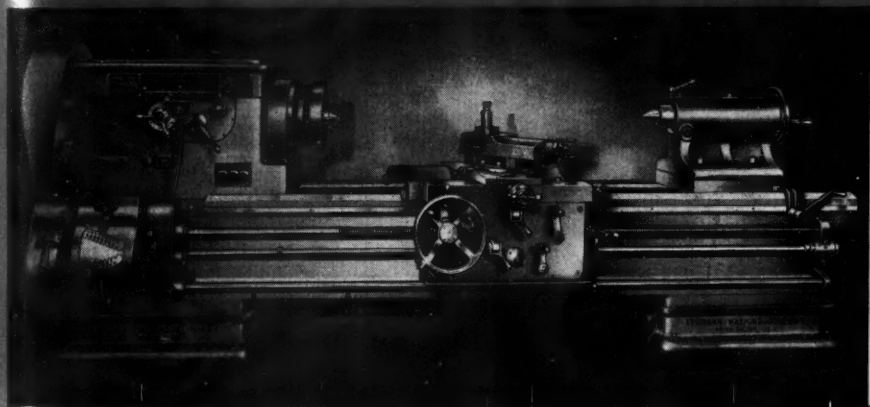


*These 3 Typical Users**

DO IT BETTER ON

HYDRATROL LATHES

HEAVY DUTY TYPE



*** (FROM LETTERS IN OUR FILES • NAMES ON REQUEST)**



1. "HYDRATROL Lathes have been very satisfactory over a very intensive 3-shift operation for a long time. They have saved us many man hours."

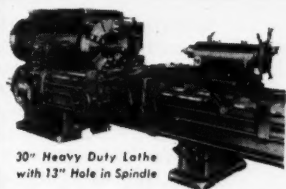


2. "For quite a few years we have had a large number of HYDRATROL Lathes in our shops here. The men working on these machines appreciate the ease of speed control afforded."



3. "HYDRATROL Lathes have been entirely satisfactory for turning high-strength forgings in record time."

Let us show you what a HYDRATROL Lathe could do in your shop. The 30" Standard Type, Heavy Duty lathe shown above, has all the ruggedness and power for the heaviest possible work. Send us prints for a specific recommendation.



30" Heavy Duty Lathe
with 13" Hole in Spindle

LARGE HOLLOW SPINDLE TYPE 5 SIZES—18" to 36"

Small . . . 18" up to 7 1/4" Hole
Medium . . . 24" up to 12 1/4" Hole
Large . . . 27" up to 13 1/4" Hole
Large . . . 30" up to 14 1/4" Hole
Large . . . 36" up to 16 1/2" Hole
(Standard type lathes, 16" to 36")

Lehmann MACHINE COMPANY

CHATEAU AT GRAND . . . ST. LOUIS 3, MISSOURI

YESTERDAY'S PIONEER . . . TODAY'S LEADER

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RADIUS CHARTS

for use with optical comparators

Weldon Radius charts are an essential aid to the efficiency of inspection and manufacturing departments. They are accurately laid out by means of a precision layout machine developed by Weldon engineers.

Included with each set of five charts is a printed easy-to-read conversion table making computations unnecessary. The lines ap-

proximately .004" in width are in direct contact with the ground glass viewing screen, eliminating possibility of parallax.

SPECIAL COMPARATOR CHARTS

For inspection of special tools or manufactured duplicate parts we are in position to make special charts of any form or forms.

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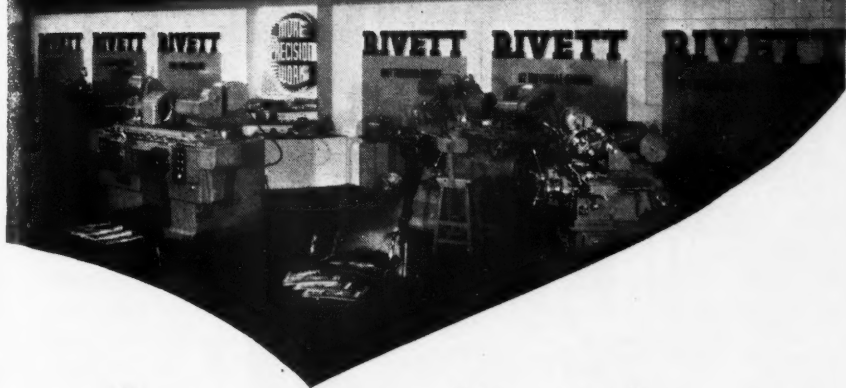
THE WELDON TOOL CO.

*Cleveland 4,
Ohio*



3000 WOODHILL ROAD

THE SHOW IS OVER!



... but there's a big job ahead!

Machine tools play an important part in the economy of a new era of industrial productivity. So think 178,000 machine tool users and manufacturers who attended the world's biggest show in industrial history.

We take this opportunity to thank those who visited our booth and to remind them that the Rivett special Show Bulletin No. 1000 illustrates but a fraction of the Machine Tools and Accessories available from our factory.

WRITE TODAY FOR YOUR COPY OF BULLETINS ON

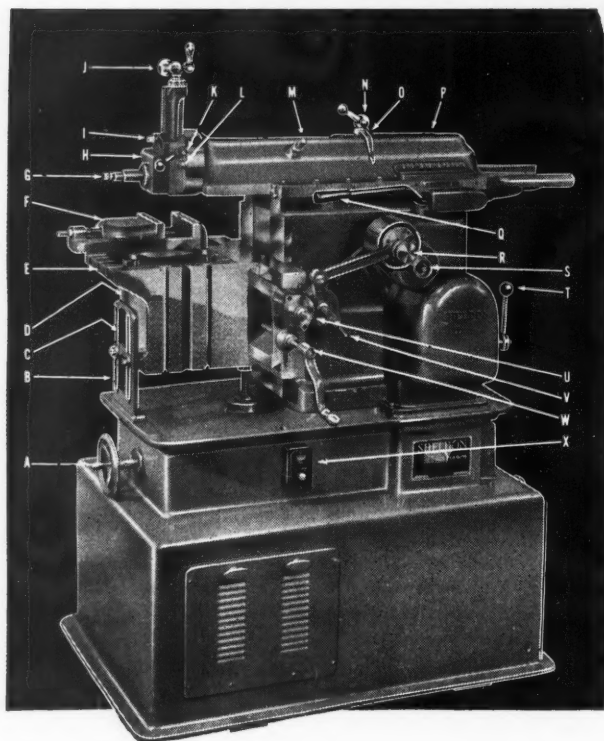
- *Precision Tool Room and Production Grinders*
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- *Precision Plain Cabinet Lathes*
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- *Cost Saving Production Accessories*

RIVETT

RIVETT LATHE & GRINDER, Inc.

BRIGHTON 35 • BOSTON • MASS.

SHELDON



- A—Variable Speed Hand Wheel
- B—Table Support
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- E—Table
- F—Vise
- G—Tool Holder
- H—Clapper Box
- I—Clapper Box Lock
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- L—Tool Slide Swivel Lock
- M—Ram Positioner
- N—Ram Clamp
- O—Stroke Indicator
- P—Ram
- Q—Clutch
- R—Feed Adjustment
- S—Shaft for Adjusting Length of Stroke
- T—Back Gear Lever
- U—Cross Feed Screw
- V—Feed Direction Control
- W—Elevating Shaft
- X—Motor Switch

SHELDON
Vernon

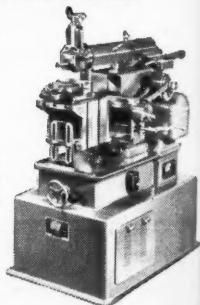
**No. 8000
12" SHAPER**

Engineered to meet today's demand for close tolerance work at a wide range of speeds . . . for a compact, easy to operate shaper that is sturdy enough for production use, still accurate enough for the tool room . . . for a capable full sized (1800 lb.) shaper at a low price.

Here is a modern quality shaper you should know about. Write for Bulletin 547B.

SHELDON MACHINE CO. Inc.

Manufacturers of Sheldon Precision Lathes • Milling Machines • Shapers
4250 N. KNOX AVENUE • CHICAGO 41, ILLINOIS. U. S. A.



2

LOGAN[®] SOLENOID AIR VALVES

Control

IN FULL AUTOMATIC CYCLE ON SPECIAL MACHINE

4 LOGAN AIR CYLINDERS
for Clamping and
Unclamping the work

1 LOGAN AIR CYLINDER
for Starting and Reversing
the Hydraulic Table Feed

All movements of this special machine are automatically controlled in sequence by means of two Logan solenoid air valves of the bleeder-operated type. The cycle is as follows:

1 The work moves through a channel until it strikes the end stop and trips an electric control switch.

2 One Logan electric solenoid operated air valve activates four Logan air cylinders simultaneously to clamp the work. At the end of the clamping movement, a cam trips an electric limit switch (center photo).

3 A second Logan electric solenoid operated air valve then activates the fifth Logan air cylinder (top photo), automatically starting the foot trips which control the hydraulic table feed.

4 The table moves upward, feeding the work to the cutters. Multiple wood boring operations are performed simultaneously on telegraph pole cross arms.

5 As the table feed movement is completed, another limit switch is tripped, and the second air valve reverses the table movement. This trips still another limit switch, operating the first air valve and releasing the clamping fixture so the workpiece can be unloaded.

APPLY THESE ADVANTAGES TO YOUR WORK

Get greater speed, accuracy and efficiency in your plant and on your products . . . use Logan Air Valves for manual or foot, remote, automatic, semi-automatic, interlocking or sequence control of cylinder movements. Call on Logan engineers for circuit recommendations. No obligation.



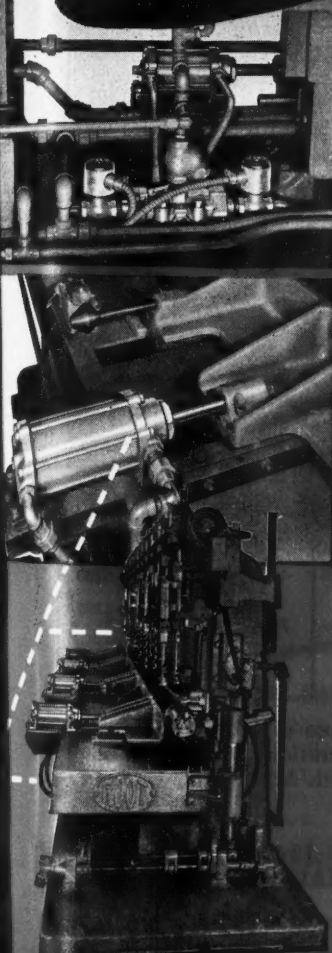
Write for **FREE**
literature on
Logan air valves,
cylinders and ac-

Logan SAVES
• TIME
• EFFORT
• MOTION
Air and Hydraulic Equipment

LOGANSPOUT MACHINE CO. INC.


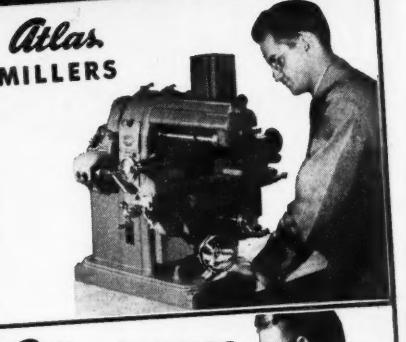
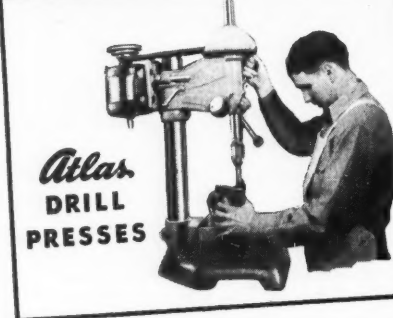
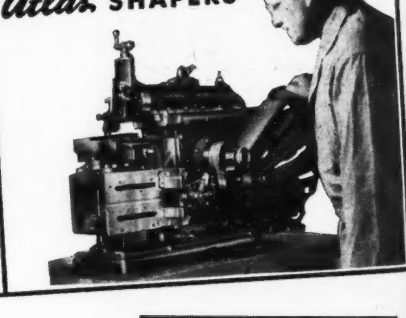
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INDIANA

CHUCKS • CYLINDERS • VALVES • PRESSES • GURE • FLOW COOLANT PUMPS



Photos courtesy of B. M. Root Co., York, Pa.

Save Hundreds of Dollars! with these LOW-COST Atlas TOOLS

<p>Atlas "QUICK-CHANGE" 10" LATHES</p> 	<p>Atlas MILLERS</p> 
<p>Atlas DRILL PRESSES</p> 	<p>Atlas SHAPERS</p> 

Day after day ... in plant after plant ... Atlas tools are saving the purchase of large expensive equipment. It's simply a matter of checking machining needs against Atlas operating and production capacities ... installing Atlas tools for *all* small parts work, reserving large machines for operations requiring large capacities. Atlas tools are precision built for close tolerance work — ruggedly engineered for smooth, dependable operation. Send for latest catalog so that you can check your own needs with Atlas specifications and capacities.


NEW LOW PRICES
(F. O. B. Kalamazoo, Less motors)
10" LATHES—\$195 to \$250
6" LATHES—\$104.75
MILLERS—\$285 to \$295
7" SHAPERS—\$335
DRILL PRESSES
12¾", \$53.50 — 15", \$65
15" (floor) \$75

ATLAS PRESS CO. 1146 N. PITCHER ST.
KALAMAZOO, MICHIGAN


DISSTON METAL CUTTING BAND SAWS

In Types, Patterns, Tempers
for All Metals, All Speeds

HARDENED THROUGHOUT



Regular type for normal high speed cutting.



Reinforced type for heavy-duty, high speed cutting.

For high speed cutting of non-ferrous metals, plastics and many other materials. Made with Regular and Reinforced teeth in all standard dimensions. Also recommended for friction cutting of ferrous metals at speeds of not less than 12,000 f.p.m.

HARD EDGE, FLEXIBLE BACK



DISSTON U.S.A.

Buttress tooth pattern for speeds of 3,000 f.p.m. and over.



DISSTON U.S.A.

Regular type for normal low speed cutting.

Hardened on tooth edge only. Teeth are milled (not punched) and accurately set by machine. Made with Regular type teeth for general metal cutting at low speeds; and with Buttress type teeth for machines operating at speeds of 3,000 or more f.p.m. . . . specially recommended for magnesium and aluminum alloys.

NEW!
DISSTON
Safety Reel



An improved design with added features. Supplied with all sizes of Hard Edge Flexible Back blades from 1/4" to 1/2" in coils of 100 feet.

For Better Metal-Cutting Tools

Ask for Disston Files . . . Hack

Saw Blades . . . Circular Saws . . . Carbide

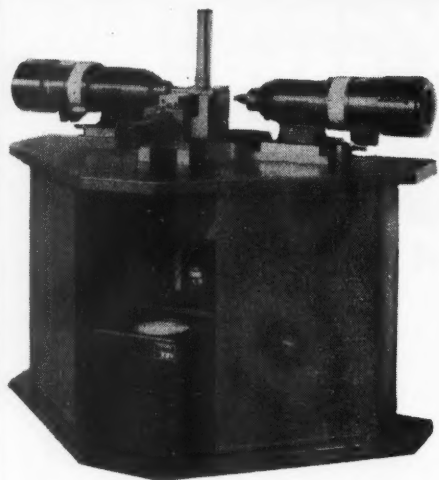
Fitted Circular Saws . . . Tool Bits.

Order from your DISSTON Distributor or write direct for further particulars.



HENRY DISSTON & SONS, INC., 1121 Tacony, Philadelphia 35, Pa., U. S. A.

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Drilling 2,000 Parts Per Hour

THE above machine incorporates two Govro-Nelson Automatic Drilling Units in conjunction with a magazine feed, drilling two No. 27 holes through 3/16" steel at an output rate of 2,000 parts per hour.

This set-up may suggest to you how you too can reduce your labor costs with Govro-Nelson Units by performing drilling operations in multiples. They handle drilling jobs at rates as much as five times as high as obtainable on ordinary drilling set-ups.

Send for literature showing the possibilities of Govro-Nelson Units from the standpoint of saving man-hours.

WRITE FOR
Literature

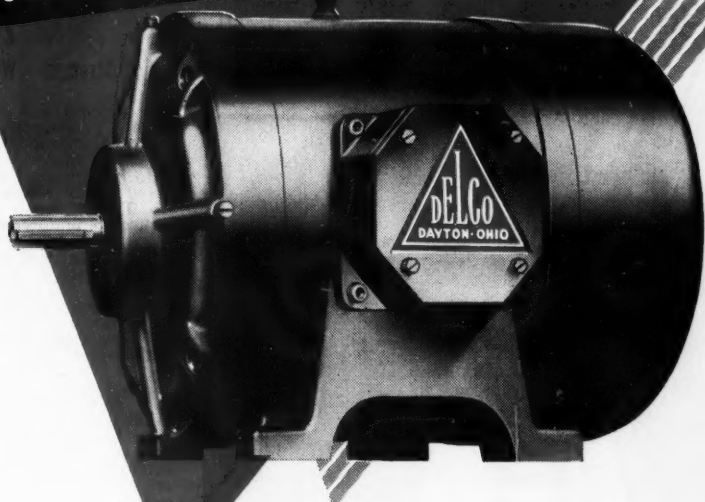
GOVRO-NELSON CO.

*Machinists of Precision Parts
for 25 Years*

1933 Antoinette
Detroit 8, Mich.

Automatic **DRILLING UNIT**

**This Rugged Performer
Needs No Pampering!**



**FEATURES THAT MEAN
BETTER PERFORMANCE
FOR THE
NEW DELCO MOTOR**

Totally enclosed, fan-cooled.

Individually taped coils.

Thoroughly insulated windings.

Unit-cast, ball-bearing rotor, dynamically balanced; parts interchangeable end to end.

Double-shell frame with new simplified cooling system.

Extra-large, watertight conduit box, usable in four 90-degree positions.

Extended, accessible mounting foot, cast as a unit with main frame.

From 1½ h.p. through 50 h.p.; NEMA frame sizes, 224 through 505.

The New Delco Motor

The double-shell frame is totally enclosed. The conduit box is oil- and water-tight. Greater simplicity and accessibility, better ventilation and insulation are achieved through new design practices and improved materials.

It's such advanced features as these that keep the great Delco motor performing faultlessly in spite of airborne dirt, dust, sand and scale . . . and that make maintenance procedures so few and so easily performed.

If you want to reduce motor failures and maintenance costs wherever operating conditions are unfavorable, you want to know more about the new Delco motor. Write for complete data.

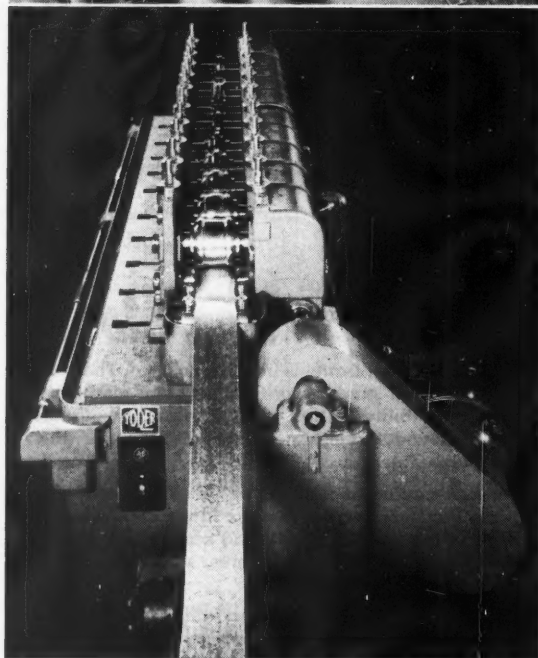
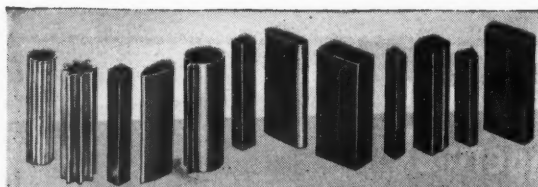
DELCO

DIVISION OF GENERAL



MOTORS

MOTORS CORPORATION



SEVEN BIG ADVANTAGES OF COLD-ROLL-FORMED SHAPES

Series of Seven No. 2

High Strength - Weight Ratio

• Structural and ornamental shapes, panels, mouldings, etc., cold formed from flat rolled metals, have higher strength-weight ratio than similar products produced by hot rolling and extruding. This is because (1) the metal is of more uniform thickness, (2) work hardening in cold rolling and forming, and (3) greater accuracy of shape, with less warp, distortion, and other defects. Yet light weight with great strength is only one out of seven equally important advantages of cold-rolled-formed products.

For 36 years, Yoder has played a leading part in the development and manufacture of cold-roll-forming mills and auxiliary equipment for doing slitting, coiling, edge conditioning, embossing, curving, welding, cutting-off and other operations on flat-rolled metal.

Many metal working operations formerly considered impractical with roll forming and auxiliary machines, are now being done on Yoder production lines, at a great gain in output, speed and uniformity, and at only a fraction of the former cost. Perhaps, if you consult us, our engineers may find such an application in your own plant. If not, we will tell you so, frankly, for we do not recommend Yoder equipment except where it is practical and profitable for the purchaser.

Bulletin No. 101 contains interesting illustrations, facts and figures on cold-roll-formed products, their uses, and equipment for making them. Ask for it.

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5532 WALWORTH AVE.
CLEVELAND 2, OHIO



**ROLL FORMING, TUBE MILL AND
SLITTING MACHINERY**

36 YEARS' LEADERSHIP • COILING • SLITTING • FORMING • EMBOSSING • CURVING • WELDING • CUTTING-OFF



PORTRAIT OF A SPEED-WET DISC "TAKING IT"

*...and coming back for **12 TIMES** **MORE!***

THERE'S AN INTERESTING LESSON in production economy back of this picture. The camera has accurately "caught" the flexural distortion of the grinding disc, as it "hugs" the work contour. But the story behind the picture is even more striking. Speed-Wet Metalite Fibre Discs, like the one in the picture, are averaging 12 castings per disc as against *one* for their nearest competitor—and at no greater cost.

Technically, the answer to this extra flexural strength and cutting life of Speed-Wet Discs is in their all-fibre backing and resin bonding. The all-fibre

backing withstands flexing like a steel spring. The heat-set resin bonding resists cutting heat and retards grit-shedding and glazing.

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Announcing
OUR NEW
SERVICE PACKAGING
JANUARY 1ST

TO: BEHR-MANNING, Troy, N. Y.

Please arrange to job-test your new Speed-Wet Discs at our plant.

Firm Name

Address

City..... Zone..... State.....

By Title.....

BEHR-MANNING

DIVISION OF NORTON COMPANY

TROY, N. Y.



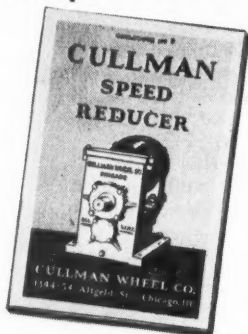
HERE'S HOW...

TO GET MORE PRODUCTION
FROM EXISTING MACHINES

CULLMAN *Speed* REDUCERS

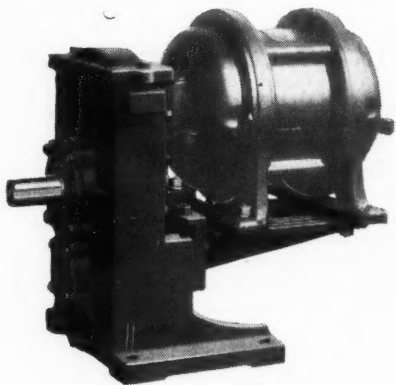
ADAPT ELECTRIC MOTORS TO SLOWER OPERATIONS

New Low-speed Range
For Motors $\frac{1}{4}$ To 15 h. p.
Fit Speeds To Job Needs



WRITE FOR YOUR COPY...

Get the facts! Ask for this helpful booklet which contains much useful data and facts for buyers. It describes Cullman Speed Reducers and other Cullman products.



Any standard electric motor can be adapted for many new uses by adding a Cullman Speed Reducer. Compact, dependable, efficient—Cullman Speed Reducers are made in single and double reduction types. Cullman units are equipped with Helical Gears, Roller Bearings, Sprockets and Roller Chains all operating in oil. *Installation is simplified by convenient motor mountings.*

CULLMAN WHEEL COMPANY

1352 V. Altgeld Street

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KEEP YOUR STEEL BAR INVENTORY

... in
balance



Your Union Drawn Distributor can do a lot to help you maintain a steady supply of cold drawn bars and shafting. He can time delivery of stocks as you need them . . . prevent over-loading one day and shortage the next. He can relieve you of the necessity for stock-piling large supplies . . . eliminate inventories too-heavy with rarely-used sizes.

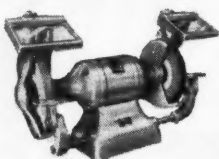
He can help balance your costs, too . . . help you save invested capital, insurance, storage space, depreciation and labor expense. In short, he can help you realize the ideal supply of steel bars and shafting.

He can do all these things because he has assumed the responsibility of warehousing cold finished steel bars and shafting in the sizes and shapes you use, ready for immediate delivery. So . . . always call him first.

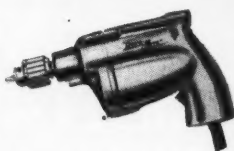




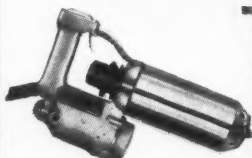
Heavy Duty Drills



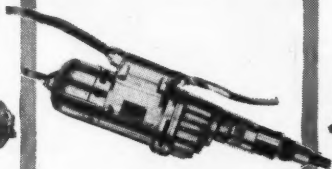
Bench Grinders



"Dyna-Mite" Drills



Hammers



Screw Drivers



Nut Runners



Portable Grinders



Disc Sanders
and Polishers

**MILLERS FALLS
TOOLS**

SINCE
1868

Constant improvements and refinements make these Millers Falls electric tools the logical choice for the job of

PRODUCING MORE AT LOWEST COST.

The Millers Falls Electric Tool Catalog gives full information; it's yours for the asking.

MILLERS FALLS COMPANY

GREENFIELD

**MILLERS FALLS
TOOLS**

SINCE
1868

MASSACHUSETTS



"Floating Power"

**in MANHATTAN
V.D.B. WHEELS**

**reduces worker fatigue and
increases production and quality**

Men like them because they reduce fatigue and strain. Freed from the tiresome vibration, chatter or jumping of the grinder in their hands, operators guide the wheels with greater accuracy. More work is done with less effort.

With a Manhattan Vibration Dampener Bushing reducing wear and tear, you find both the wheel and the portable grinder last longer, too. Maintenance costs go down and the shop shows a better profit.

... Big results from a little thing like a vibration absorbing rubber bushing, but a trial and comparison proves how savings are accumulating for present users.

The Manhattan V.D.B. Bushing and Wheel are sold as a unit in straight types up to 8" in diameter. Sold direct by the

ABRASIVE WHEEL DEPARTMENT



RAYBESTOS-MANHATTAN INC.

Keep Ahead with Manhattan

MANHATTAN RUBBER DIVISION

PASSAIC, NEW JERSEY

November, 1947

MODERN MACHINE SHOP 63



AFTER YOU GET BACK FROM THE SHOW... *don't get off this one train of thought*

Don't sidetrack all those ideas on new products, markets and cost-reduction which you brought back, red hot, from Chicago — just because you lack plant facilities, equipment, or hours in the day.

Take your new ideas — or your bothersome old problems—to Taft-Peirce, where you will find all these services and products at your command:

Engineering, Tooling, Contract Manufacturing: The T-P Contract Division will tool and produce anything from a single tool or part to complete mechanisms in quantity.

Special Gear Cutting & Grinding, Thread Milling & Grinding: A new department with ample capacity for cut or ground gears and threads.

Standard Machine Tools: The No. 1 Precision Surface Grinder and the 6" Rotary Surface Grinder. The New Taft-Peirce Spline and Gear Grinder. The Taft-Peirce Back Spot Facing Machine.

Production & Inspection Tools: Sine bars and fixtures, surface plates, angle-measuring equipment, etc.

Standard & Special Gages: All types of AGD Standard plain and thread plug, ring, and snap gages. Special designs to specification. The new Taft-Peirce CompAIRator air gage.

Magnetic Chucks: Rectangular, rotary, and tilting-base SUPERPOWER chucks. Magnetic V-blocks and angle plates.

Write to The Taft-Peirce Mfg. Co., Woonsocket, R. I.

... for Engineering, Tooling, Contract Manufacturing
TAKE IT TO TAFT-PEIRCE





IT TAKES SOMETHING EXTRA TO BE A Specialist!

It takes extra study and effort to be a research specialist, solving the scientific problems of tomorrow . . . so, too, it has taken years of experience in our own field to produce those extra qualities found in all BATH ground thread taps . . . toughened by hardening and tempering . . . then skillfully ground from the solid!

Look for the name BATH on your taps—special or standard stock sizes—it's your guarantee of an important "plus value" . . . the experience of specialists! We invite your inquiry on any tap problem. See your BATH representative without delay . . . or write direct.

JOHN BATH CO.

INCORPORATED

20 Grafton Street
WORCESTER 8, MASS.

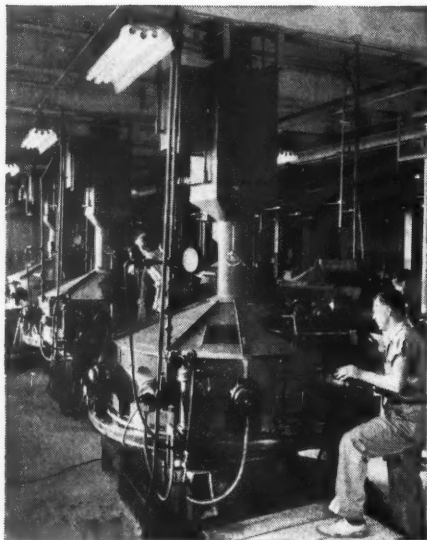
GROUND THREAD TAPS • PLUG AND RING TAPS • INTERNAL MICROMETERS

Electro-MIST

eliminates oil "Smog" from
high speed machining



THIS battery of Kingsbury Automatics is operating at top speed producing tire valves. Note the absence of oil mist and smoke usually associated with such high speed operation. Plant interior is "clean as a pin" and visibility is perfect.



Elimination of this "smog" is made possible by AAF Electro-Mist Collectors. One of these units is suspended directly above each of the automatics. The oil mist is drawn up directly from the source to the collector where dust, smoke and even the smallest particles of oil are removed from the air by combination mechanical and electronic filtering processes. The air leaving top of the unit, being cleaner than the surrounding atmosphere, is returned to the working area.

The Electro-Mist is completely self-contained and all parts may be removed without tools. Removable plate assemblies permit washing of collector plates at any convenient location. Unit is designed for floor or overhead mounting. For complete information, write for Bulletin 251.

AMERICAN AIR FILTER CO., INC.

100 Central Ave., Louisville 8, Ky.

In Canada: Darling Bros., Ltd., Montreal, P.Q.

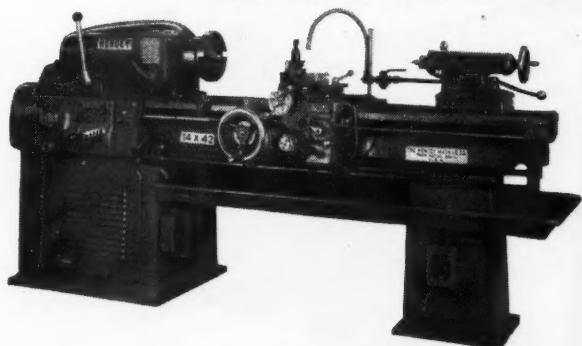


AIR FILTERS
AND DUST CONTROL EQUIPMENT

AN OUTSTANDING DEVELOPMENT

THE NEW HENDEY No. 2

GENERAL PURPOSE LATHE



First revealed at the Machine Tool Show, the new Hendey No. 2 General Purpose Lathe is an outstanding development in belt-driven lathes. It offers simpler, safer, faster and more economical operation on all types of light-duty work. Special ingenuity in designing the belt drive and belt shifting mechanism have resulted in two important operational features. First, because the spindle is not directly driven by a belt, but through a gear tooth clutch, belt tension can have no effect on spindle performance. Second, belt shifting has been made 100% safe, simple and fast. The entire belt, pulley and clutch arrangement is fully enclosed. To shift the belt, all the operator need do is pull the belt-shift lever toward himself, move it right or left to engage in the position indicated on the Spindle Index Plate. Four initial spindle speeds are immediately available and, when combined with the back gears, the number is increased to eight, ranging from 30 to 1142 r.p.m.

Other important features of the new Hendey No. 2 include a quick change gear box offering 48 different thread and feed changes, preloaded anti-friction bearing mounted spindle, automatic lubrication throughout, super precision lead screw, bridge truss bed construction and spindle accurately indexed for multiple thread cutting.

The new Hendey No. 2 is truly the last word in belt-driven, general purpose lathes. It will pay you to investigate it thoroughly. Write for complete details today.

The Hendey Machine Company

Hendey

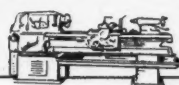
Main Office and Plant — Torrington, Connecticut

Offices — N. Y., Chicago, Boston, Detroit, Rochester, Los Angeles, San Francisco

Representatives in — Philadelphia, Cleveland, Pittsburgh

TOOL ROOM LATHES

12" - 14" - 16" - 18" - 20"



SHAPERS

12" - 16" - 20"

A BUYING GUIDE FOR ABRASIVES

POINT No. 10



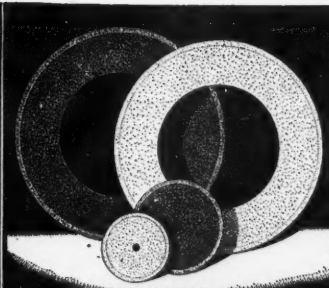
REPUTATION

As many purchasing agents realize, known names carry plenty of weight in winning acceptance and approval of the men who use the products they buy. In abrasives, no name is more favorably known than that of The Carborundum Company. Instantly recognized and widely respected, it has signified peak quality for years.

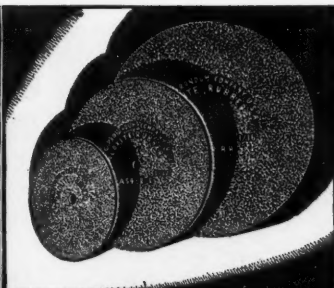
Management knows well the standing of The Carborundum Company in industry. Men who have worked with these abrasive tools are familiar with their superior performance. When abrasives by CARBORUNDUM are specified and ordered, there is no need to defend, explain or justify your selection. They are the choice of those whose preference has been confirmed by experience. The Carborundum Company, Niagara Falls, New York.



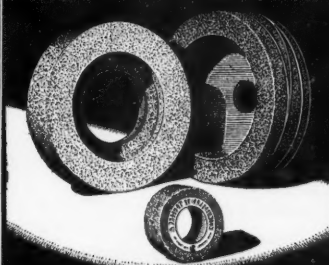
A Good Rule for Good Grinding



Specialized wheels by CARBORUNDUM
for thread grinding.



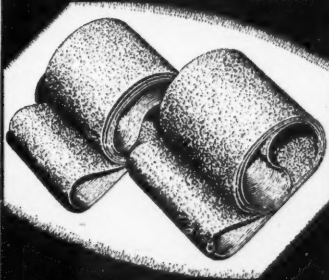
Cutting-off wheels ... the modern tool
for faster, less costly, more finished cuts.



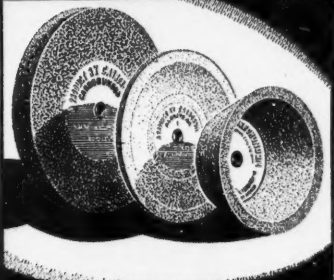
Cool-cutting green grit wheels for
cemented carbide.



Diamond wheels to meet stiffer
technical needs.



A coated abrasive for every
sanding and finishing condition.



All standard shapes are supplied in
grinding wheels by CARBORUNDUM.

... CALL IN

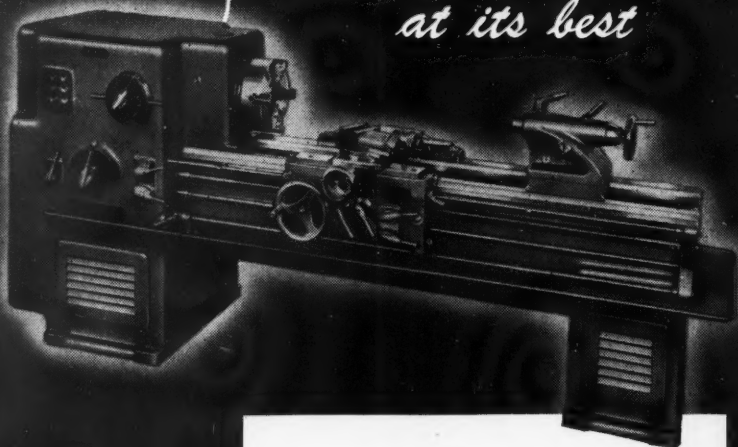
CARBORUNDUM

TRADE MARK
● BONDED ABRASIVES ● COATED ABRASIVES ● ABRASIVE GRAINS AND COMPOUNDS

November, 1947

QUALITY

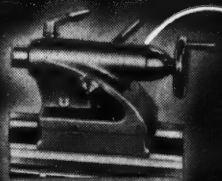
at its best



*Sidney
Lathes*

When you consider the many construction features offered in Sidney Lathes, you can readily understand why it has ample power to produce accurate work over long periods. For example, the double wall bed of semi-steel, nickel mixture—the 32 speed continuous tooth herringbone geared head—the totally enclosed quick change gear box providing sixty thread and feed changes—the double wall apron—and centralization of controls for ease of operation. These and many other features contribute to the fact that the Sidney Lathe is the outstanding machine in its field.

Bulletins on all sizes available.



**"If it isn't Wide Enough
It isn't Good Enough"**

**...TO MEET
TODAY'S PROBLEMS**

**GET 3 DESIGN BENEFITS WITH
NORMA-HOFFMANN
"CARTRIDGE" BEARING**

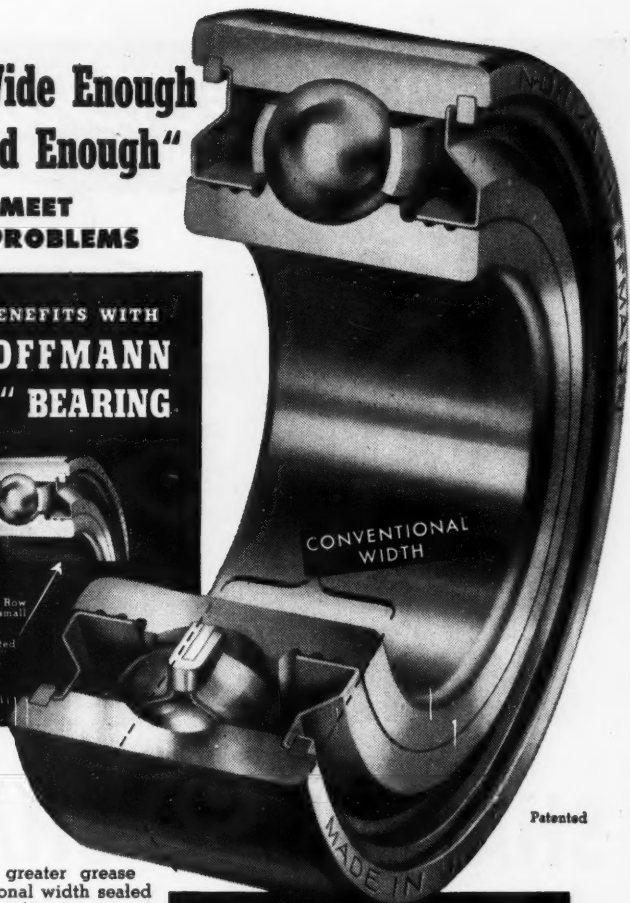


CONVENTIONAL Single Row
Width sealed Bearing has small
grease capacity.

NORMA-HOFFMANN patented
double row width "Cartridge"
Bearing has 100% greater
grease capacity.

**Here's What
You Get**

- 1. Longer Life** A 100% greater grease capacity than conventional width sealed bearings. This means longer grease life... longer periods between relubrication—because a large volume of grease does not oxidize or dry out as readily as a thin film of grease.
- 2. Greater Contact Area** 43% to 85% greater contact area between shaft and bearing bore and between housing and bearing O.D., as compared to conventional width bearing. This eliminates need for locknuts and results in greater shaft strength as it is unnecessary to cut locknut threads. Slippage and peening are also prevented.
- 3. Full Load Carrying Capacity** Unlike many other sealed bearings, full size balls are used; hence, there is no reduction in load carrying capacity.



America's

No. 1 SEALED BEARING

by

NORMA-HOFFMANN

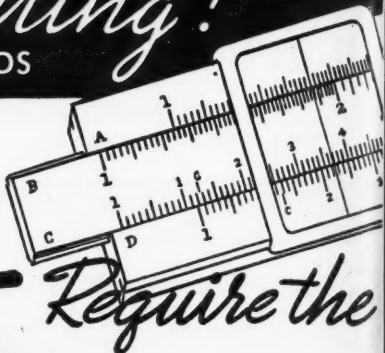
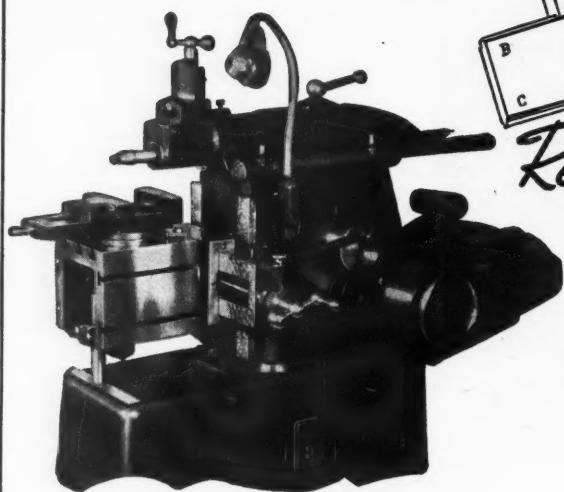
NORMA-HOFFMANN BEARINGS CORPORATION,
STAMFORD, CONNECTICUT

FIELD OFFICES: New York, Chicago, Cleveland, Detroit,
Pittsburgh, Cincinnati, Los Angeles, San Francisco, Seattle,
Phoenix

TODAY'S

PRODUCTION DEMANDS

Exacting!



**ACCURACY
DEPENDABILITY
VERSATILITY**

Built Into

SHAPE-RITE SHAPERS

You can depend upon the built-in accuracy and durability of Shape-Rite Shapers to withstand day-in and day-out capacity production. The speedy set up features and ease of operation will increase the output of precision work. Shape-Rite Shapers are Versatile, and will handle any type of work within the capacity of eight-inch stroke Shapers. Unexcelled for Tool and Die Makers and small instrument manufacturers.

Complete Specifications on Request Write to Dept. M-11.

Sales Service Machine Tool Co.

2363 UNIVERSITY AVE.

ST. PAUL 4, MINNESOTA



Production gaging with
External Comparator No.
951 and Amplifier No. 950.

NEW! *Electronic*

• EXTERNAL • INTERNAL

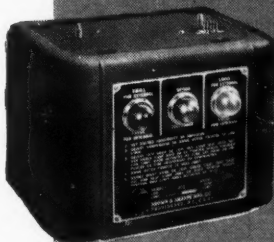
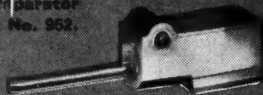
Precision gaging on a mass-production scale is now both practical and economical with the new Brown & Sharpe Electronic Measuring Equipment. By applying electronic-supersensitivity, accurate gaging to .00001" can be performed as fast as test pieces can be handled.

An outstanding advantage is the separate amplifier unit which isolates all important heat-producing elements . . . preventing temperature drift in gaging units. Another unique advantage . . . the true linear response of gaging units permits accurate setting for entire scale with only 1 gage block or master.

Investigate the many advantages of this time-saving, precision measuring equipment. Write Brown & Sharpe Mfg. Co., Providence 1, R. I., U. S. A.

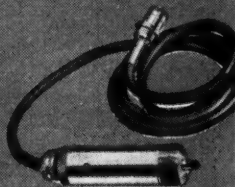
We urge buying through the Distributor

Internal Comparator
Attachment No. 952.



Signal Light At-
tachment No. 953

Gage Head Car-
tridge No. 953
for mounting in
jig or fixture.



BROWN & SHARPE



**"UNBRAKO"
SOCKET SET
SCREW WITH
KNURLED CUP POINT**



The knurled cup point of this "Unbrako" makes it a Self-Locker, the points dig in and hold fast even when subjected to the most chattering vibration.

Pat'd and Pats. Pend.

**"UNBRAKO"
SOCKET SET
SCREW WITH
KNURLED THREADS**



Knurling the "Unbrako" Socket Set Screw, as shown, swages the threads and an excellent Self-Locker is the result — For use where the points such as: flat, dog, cone and oval do not lend themselves to knurling.

Pat'd and Pats. Pend.

**"HALLOWELL"
KEY KIT**

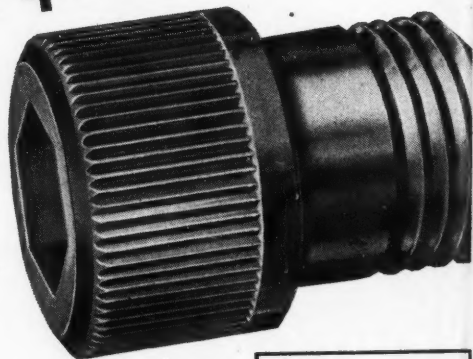


Pats. Pend.

You can't tighten or loosen socket screws without a hex socket wrench, so why not get our No. 25 or No. 50 "Hallowell" Hollow Handle Key Kit which contains most all hex bits.

KNURLED

for quicker assembly



Knurling of Socket
Screws originated with
"Unbrako" in 1934.



Reg. U. S. Pat. Off.

**KNURLED SOCKET HEAD
CAP SCREWS . . . assure**

SLIP- and FUMBLE-PROOF GRIP

Because the "Unbrako" Knurled Head Cap Screw provides a slip- and fumble-proof grip, it can be screwed-in faster and farther with the fingers, be they ever so oily, before it becomes necessary to use the slower wrench. The Internal Wrenching feature facilitates compact designs . . . reduces weight and costs. "Unbrako" Knurled Socket Head Cap Screws are available in sizes from No. 4 to 1½" in diameter and in a full range of lengths. Write for your copy of the "Unbrako" Catalog.

**"Unbrako" Products are sold entirely
through Industrial Distributors.**

OVER 44 YEARS IN BUSINESS

STANDARD PRESSED STEEL CO.

JENKINTOWN, PENNA. BOX 556 BRANCHES BOSTON CHICAGO DETROIT INDIANAPOLIS ST. LOUIS SAN FRANCISCO

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Cap
meter
of the

, 1947



***a sturdy
accurate drill
for tool room
or
production
line***

● Footburt Sensitive Drilling Machines have a wide range of speeds to be used in handling all sizes of tools within the rated drilling capacity of $\frac{1}{2}$ " in mild steel or $\frac{3}{4}$ " in cast iron. Standard speeds are 570 to 2300 RPM with 1200 RPM motor or 855 to 3350 RPM with 1800 RPM motor. The back gear attachment provides four additional slow speeds with a minimum of 185 RPM using the 1200 RPM motor or 277 using the 1800 RPM motor. Power feed and tapping attachments are available on any spindle to make production work easier and faster. Sturdy construction insures the maintenance of accuracy over many years of use.

THE FOOTE-BURT COMPANY • Cleveland 8, Ohio
Detroit Office: General Motors Building



FOOTBURT

Sensitive
DRILLING MACHINES

ONCE AGAIN -- Your Industrial Distributor

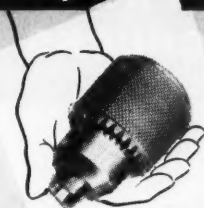


Jacobs BALL BEARING SUPER CHUCK

Here's the fast and easy-working anti-friction model that cuts down set-up time. It is the finest chuck in the famous Jacobs line. Latest refinements include (1) an inserted ball thrust race with continuous deep groove (2) a heat treated alloy steel nut giving four times the load carrying capacity of former construction. Smoother in operation — sturdier than ever — the "N" Series Super Chuck is the last word on heavy duty production work.

TOOL UP YOUR TOOLS WITH NEW *Jacobs* HIGH-ACCURACY

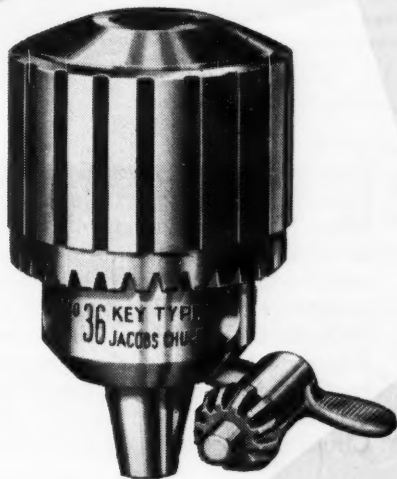
Can Deliver Jacobs Chucks from Stock!



Excessively worn or damaged chucks can cause —

- Drill Slippage
- Drill Breakage
- Inaccurate Holes

Replace your old chucks now — to prevent wasted man hours and material. Your industrial supply distributor has new Jacobs Chucks in stock.



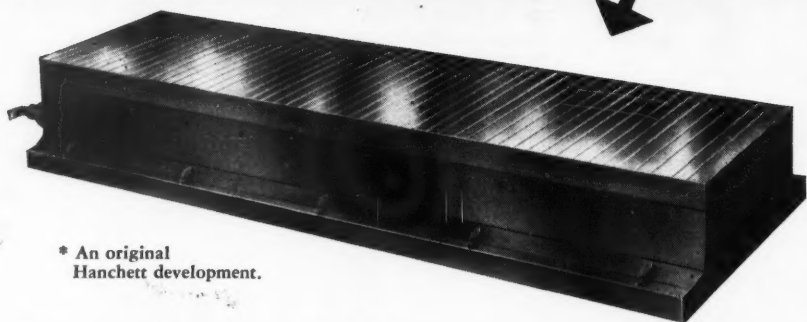
Jacobs PLAIN BEARING CHUCK

For light and medium duty requirements here's a lot of chuck at very moderate cost. Maximum strength, accuracy and powerful grip have been carefully built into it. Latest improvements include (1) fluted sleeve internally ground on three diameters (2) nickel molybdenum alloy steel jaws expertly heat treated (3) precision bored taper hole in hardened and ground body. The largest selling drill chuck in the world . . . the unanimous choice of portable tool manufacturers.

Chucks SOLD EXCLUSIVELY BY INDUSTRIAL DISTRIBUTORS

THE JACOBS MANUFACTURING CO., HARTFORD 2, CONNECTICUT

More **POWER** ---
MORE APPLICATIONS with
HANCHETT *Magna-Lock* **SUPRÊME**
LAMINATED * MAGNETIC CHUCKS



* An original
Hanchett development.

Tremendously increased holding power makes the new Magna-Lock Supreme applicable to many more heavy machining operations. Now you can apply the advantages of magnetic chucking to milling, shaping, and planing operations. Exclusive laminated construction extends working surface within $\frac{1}{2}$ " of chuck ends, and to extreme edges, giving you 22% more magnetic area than is available with lead-filled chucks.

Custom designed surface contours are available. A combination rectifier-demagnetizer for chucks 6" x 24" and smaller can also be furnished. Ask Hanchett for recommendations on Magnetic Chuck applications in your shop today.

Ask for Bulletin 047-MK



HANCHETT MFG. CO.

Magnetic Chuck Division

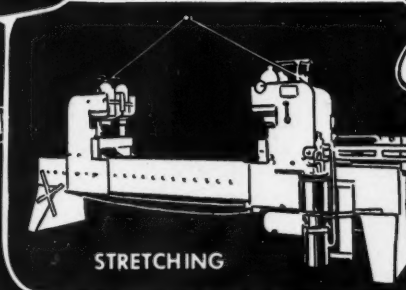
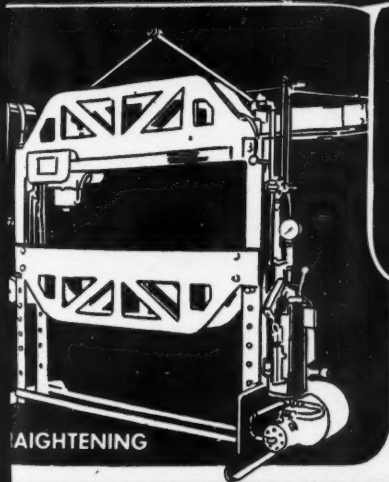
BIG RAPIDS

MICHIGAN

Name the JOB!

There's a KRW PRESS that can do it BETTER...for LESS

● Illustrated here are four KRW Hydraulic Press adaptations that are typical many being built by KRW today. All are priced from 30 to 200% less than competitive makes of comparable tonnages or capacities. All are motor-driven and incorporate the time and production proven features that have made the standard KRW Hydraulic Arbor Presses...the most widely used press of their type America. Take the KRW Sliding Head Straightening Press, an example. This type KRW Press has been effecting tremendous labor savings in fabricating plants where plate must be "true up" before it is processed or fabricated. The heavy, hand method formerly used was archaic and very costly by comparison. The same story holds true of KRW Stretcher-Levellers, KRW Blanking and Forming Presses, KRW Compression Molding Presses, KRW Bending Presses and many others. To save your time and ours, tell us your problem in terms of what you want to accomplish. We'll give you an answer and furnish literature that pertinent to your needs. Mail the coupon now.



Write for the
**NEW
KRW
Catalog.....**



K. R. Wilson, 215 Main Street, Buffalo 3, N. Y.

Please send your catalog. We are particularly interested in your
Bending Presses ☐ Compression Molding Press ☐
Straightening Press ☐ Stretcher-Leveller ☐ Forming and
Blanking Press ☐

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MEN RESPONSIBLE FOR PRODUCTION DEPEND ON



● Sound engineering based on long practical experience is responsible for Niagara advanced design resulting in more working strokes per hour with consequent lower costs per piece.

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NIAGARA MACHINE & TOOL WORKS, BUFFALO 11, NEW YORK DIS

NIAGARA

PRESSES SHEARS

AND OTHER MACHINES
FOR MAKING MORE THINGS
FOR MORE PEOPLE



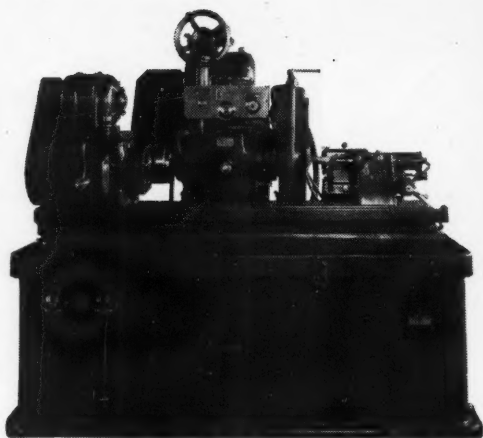
DISTRICT OFFICES — NEW YORK • CLEVELAND • DETROIT

Why Fitchburg

PUSH-BUTTON GRINDING

is lower cost

GRINDING...



INEXPENSIVE FIRST COST

MAXIMUM PRODUCTIVITY

AUTOMATIC PRECISION

SPECIALIZED EXPERIENCE



We can design special cylindrical grinding machines inexpensively because in the FITCHBURG BOWGAGE WHEELHEADS we have the most efficient, completely automatic cycle Wheelheads ever designed—all ready to be installed on a suitable base. The Bowgage Wheelhead is a standard item for which you pay standard prices.

Your FITCHBURG Grinder will be truly productive—making the maximum use of the most modern, low-cost grinding techniques: formed wheel grinding, simultaneous grinding of multiple surfaces, Fitchburg Automatic Size Control, etc. All these guarantee that your Fitchburg Grinders will give you an amazingly low cost per piece.

All the precision you can possibly want—grinding to limits as low as .00005"—automatically, by simply pushing the "Start" button. The machine stops itself when the final size is reached.

FITCHBURG has for more than 25 years specialized in designing and building special automatic mass-

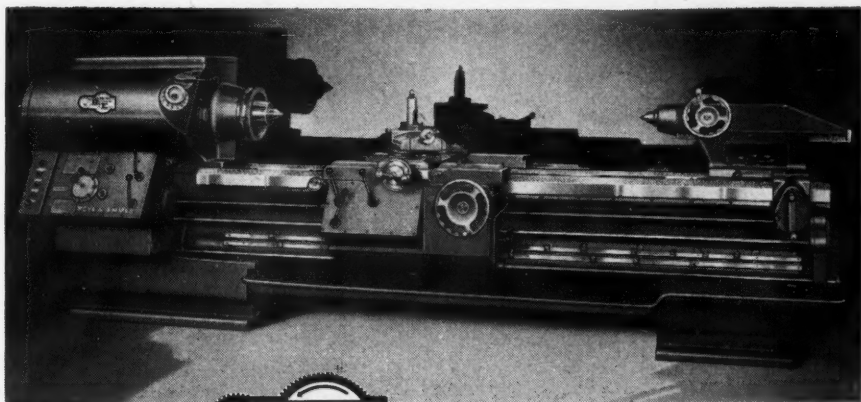
production grinding equipment. You get the benefit of this experience in the low figures on our bill.

We may already have a design that will perfectly suit your needs. An inquiry—with part prints if possible—will in no way obligate you.

FITCHBURG GRINDING MACHINE CORP.

FITCHBURG, MASSACHUSETTS, U.S.A.

Manufacturers of—Bowgage Wheelhead Units, Multiple Precision Grinding Units, Surface Grinders, Cylindrical Grinders, Gear Grinders, Rack Full Universal Grinders and Special Purpose Grinders.



Golden anniversary model, the talk
of the recent Machine Tool Show

CLEAN LOOKING AS A WHITE



QUIET AS A VERY LITTLE



SMOOTH RUNNING AS YOUR



EFFICIENT AS A COLONY OF



You'll need this bulletin to
quickly grasp the many improve-
ments in this "golden" model.
Please write on your firm's
letterhead or mail coupon.



BOYÉ & EMMES
MACHINE TOOL COMPANY
117 Caldwell Dr., Cincinnati 15, Ohio

Gentlemen—Please send bulletin to

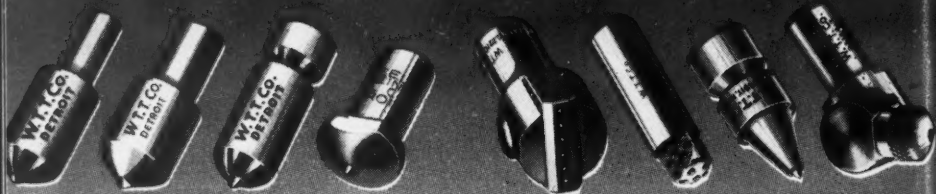
Name

Title

Company

Business Address

City Zone State

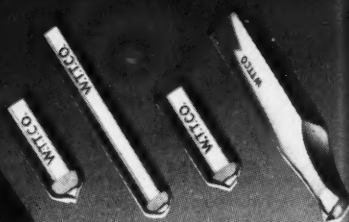


IMPIER DRILLING TOOLS

TURNING AND BORING TOOLS

1/2" DIA. 1/2" DIA. 1/2" DIA. 1/2" DIA. 1/2" DIA. 1/2" DIA. 1/2" DIA. 1/2" DIA.

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LOOSE
DIAMONDS

GAGE TOOLS

RADIUS FORMING TOOLS

1/2" DIA. 1/2" DIA. 1/2" DIA. 1/2" DIA. 1/2" DIA. 1/2" DIA. 1/2" DIA.

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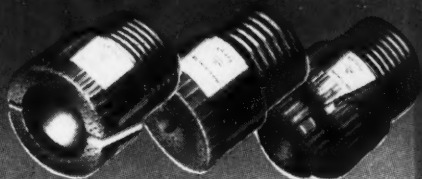
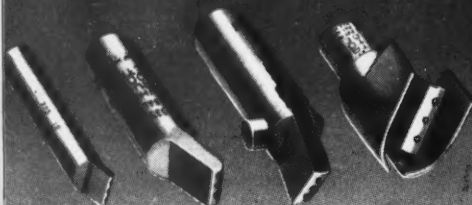


PATENTED T-30-JUNE TOOLS

DIAMOND DRILL BITS

1/2" DIA. 1/2" DIA. 1/2" DIA. 1/2" DIA. 1/2" DIA. 1/2" DIA. 1/2" DIA.

1/2" DIA. 1/2" DIA. 1/2" DIA. 1/2" DIA. 1/2" DIA. 1/2" DIA. 1/2" DIA.



*"We can guarantee our
diamond tools because
they are engineered
to the job."*

Harry J. Hagg
PRESIDENT



THIRTY-SEVEN YEARS AGO, when Wheel Trueing started in the diamond business, there were no standards of diamond tool value and guarantees were specifically avoided.

Wheel Trueing pioneered the idea of studying the job to be done, engineering the tool and the diamond to the job and guaranteeing satisfactory performance.

Consequently, for many years, Wheel Trueing customers have enjoyed the efficiency and the economy of using diamond tools scientifically matched to their work.

Our Engineering Data Sheets for supplying job information and our booklets on many types of Standard and Special diamond tools are yours for the asking. We invite your inquiries.

WHEEL TRUEING TOOL COMPANY

3200 W. Davison Avenue • Detroit 6, Michigan

WHEEL TRUEING TOOL CO. OF CANADA, LTD.

575 Langlois Avenue • Windsor, Ont., Canada

THE ADAMANT TOOL COMPANY

Eastern Division of Wheel Trueing Tool Co.

33 West Street • Bloomfield, New Jersey

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Long, Accurate Gage Life!

WITH THESE
LINCOLN PARK
Reversible Wire Type
CARBIDE
PLUG GAGES

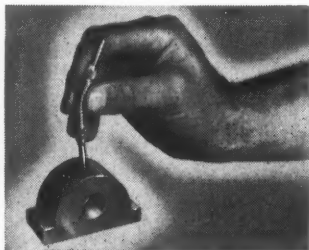
If you use plug gages under $\frac{3}{16}$ " diameter, you owe it to yourself to compare these Lincoln Park gages—in eventual cost, lasting accuracy and practicability—with any other gages used for the same purpose.

Lincoln Park Wire Type Plug Gages made of cemented-carbide are approximately two and one-half times the price of similar gages made of steel. But the accurate service life of these gages is at least fifty times greater than can be expected of the best steel gages. In addition, wear-resistance allows users to disregard wear allowance for gage life and take advantage of full print tolerances—a feature which reduces to a minimum the rejection of parts due to inaccurate inspection.

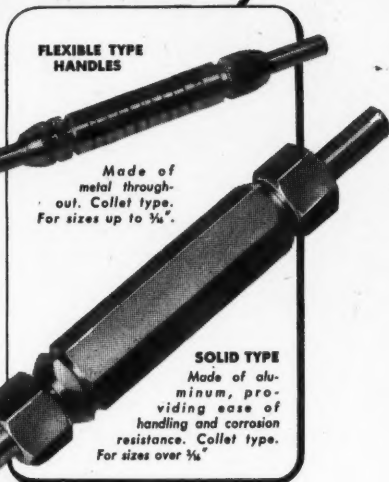
They are available in a size range from .025" to .510", in either Class XX or X tolerances, and are supplied with all-metal handles of the types illustrated.

The Light-Weight Flexible Handle

Supplied For Sizes
Up To $\frac{3}{16}$ "



... is an exclusive feature of Lincoln Park Reversible Wire Type Plug Gages. As illustrated, hazard of breakage of members due to accident or rough handling is greatly reduced. (For gages over $\frac{3}{16}$ ", solid aluminum, collet type handles are supplied.)



HERE ARE OTHER

Unusual Advantages

OFFERED BY THESE REVERSIBLE WIRE
TYPE CARBIDE PLUG GAGES

- High elastic limit of carbide insures against bent or deformed wires.
- Being non-corrosive, members will not rust in the handle or in storage.
- Since carbides are non-magnetic, the gages will not pick up chips or other metallic substances which might scratch work.
- Members are easily adjusted for length by loosening nuts in ends of handle and can be cut off as worn and reversed in handle.

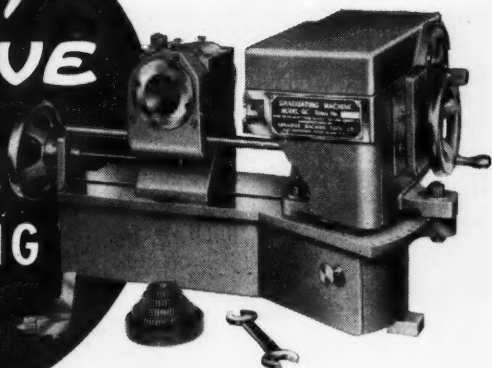
 **Lincoln Park INDUSTRIES, INC.**
1733 FERRIS AVENUE • DETROIT 23, MICHIGAN

Announcing

ABRASIVE

MODEL GC

CIRCULAR GRADUATING MACHINE



The Model GC CIRCULAR GRADUATING MACHINE accurately and quickly graduates hand wheels, dials, knobs and similar parts. This machine is capable of a wide range in the number of possible graduations — including all commonly used English graduations, Metric graduations, and "Degree" graduations. The type of graduation can likewise be readily changed to conform with the requirements of any of these systems.

The actual cutting of the graduations is performed by a single-point tool which produces a clear, sharp line of almost any desired length or combination of lengths. Spacing of the graduations is controlled by a set of change gears and through a worm and worm wheel, assuring "Dividing Head" accuracy. Graduations parallel with the axis of the work and angular graduations up to 45° can be cut.

The unit is power driven which results in uniform, rapid production. Tests have shown that 55 hand-wheels, with 100 graduations on each, can be graduated in one hour. An automatic cut-out stops the machine at the end of each cycle so that after the setup is completed it is merely necessary for the operator to take off one piece and put on the next. To change the setup from one size and type of work to another is but a matter of minutes. It is only necessary to put on the proper change gears, the proper graduating cams and work holder, then set the depth of cut and proceed.

ABRASIVE MACHINE TOOL CO.
EAST PROVIDENCE 14, R. I., U. S. A.

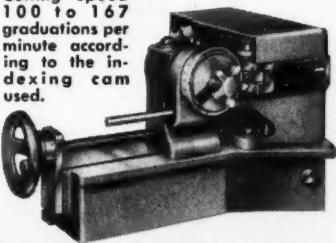
SPECIFICATIONS

CAPACITY

Smallest diameter graduated with std. equip. 1½". Largest diameter graduated with std. equip. 20". Will graduate straight dials or angular dials up to and including 90° included angle. Maximum diameter for angular dials varies with the work, i.e. for 60° included angle, the maximum diameter is approx. 18"; and for 90° included angle, the maximum diameter is approx. 15". Length of graduation 0" to 5/16".

SPEED

Cutting speed 100 to 167 graduations per minute according to the indexing cam used.

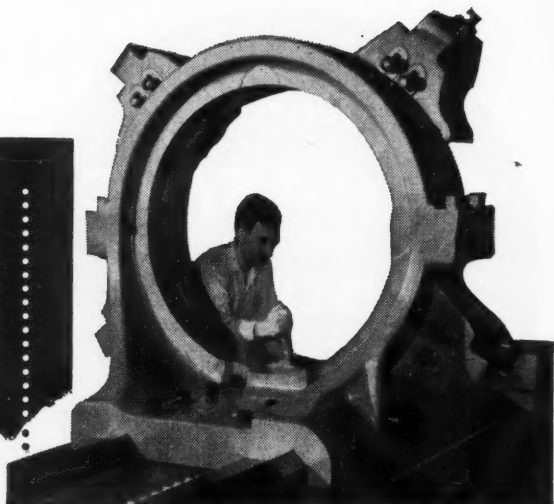


Model GC machine set up to graduate an aluminum dial which has a knurled rim extending above the graduated surface.

ABRASIVE

ACCURACY BOOSTS PRODUCTION

BIG PRODUCER



How do you handle machining of outsize, irregular parts?

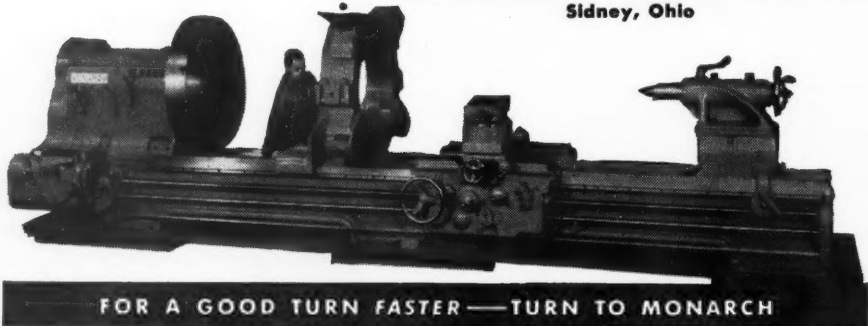
Here's a way that may save you time . . . and money. Hold the part in a fixture or cradle, and turn it on a Monarch; you'll get peak production *at a profit.*

For example, for one customer we've raised a 32" x 180" Model NN Engine Lathe in the sand, to swing 48" over the bed and 36½" over the cross slide, as illustrated. There's ample power for the turning and boring operations, yet no idle investment in ponderous, unused capacity. The anti-friction, steady rest provides 36" to 38½" capacity—more than enough to handle a variety of jigs and fixtures. The result is a simple solution to this customer's bothersome production problem. May we help you, too?



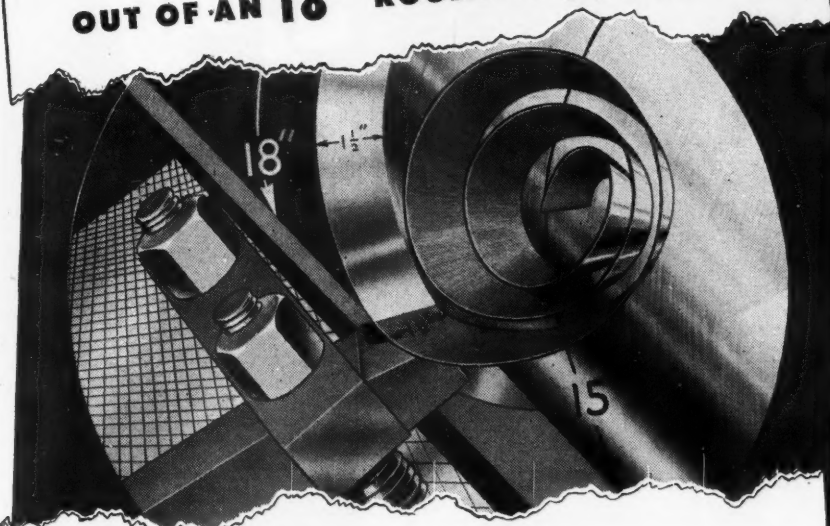
THE MONARCH MACHINE TOOL CO.

Sidney, Ohio



FOR A GOOD TURN FASTER — TURN TO MONARCH

HOW TO MAKE A 15" ROUND OUT OF AN 18" ROUND IN *ONE CUT!*



3000 pounds of chips
per hour cut with *one* **FIRTHITE** **GRADE** **104** *tool!*

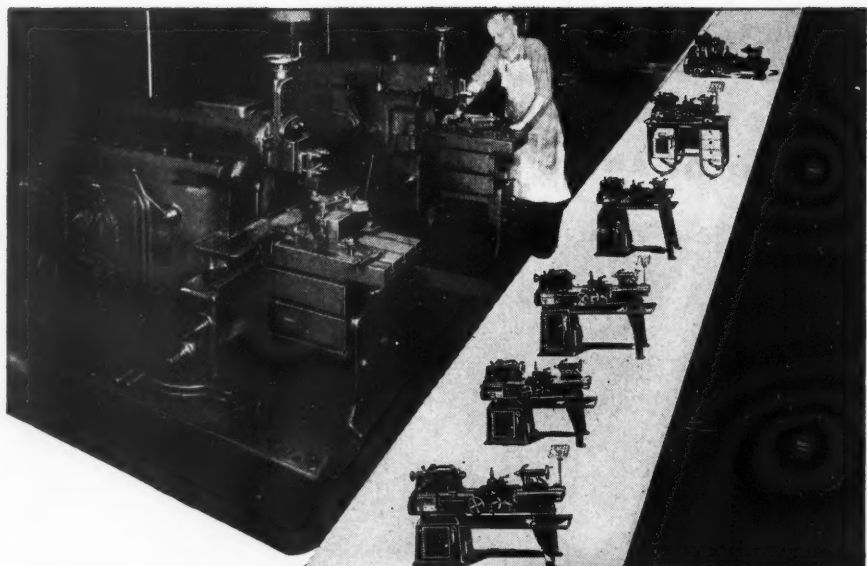
This truly remarkable example tells its own story of Firthite sintered carbide heavy-duty cutting ability and production efficiency:

WORK PIECE.....	SAE 3140 (300 BHN)
DEPTH OF CUT.....	1½"
FEED PER REVOLUTION.....	0.044"
CUTTING SPEED.....	197 feet per minute
H. P. CONSUMED.....	.65

Firth Sterling

STEEL & CARBIDE CORPORATION

McKEESPORT, PA. • NEW YORK • HARTFORD • PHILADELPHIA • PITTSBURGH • CLEVELAND • DAYTON • DETROIT • CHICAGO • LOS ANGELES



machine tools to help make machine tools

It's generally conceded that the most critical buyers of machine tools are the machine tool builders themselves. The South Bend Lathe Works are typical.

Should you go through the South Bend plant you would see Rockford Hy-Draulic Shapers applied to many different types of work. For example, one job involves a difficult shoulder cut on a Change Gear Bracket. Two shoulders are cut at one time . . . up to a blind shoulder. Tolerances of plus or minus 0.001" are maintained. No further finish is required on the part.

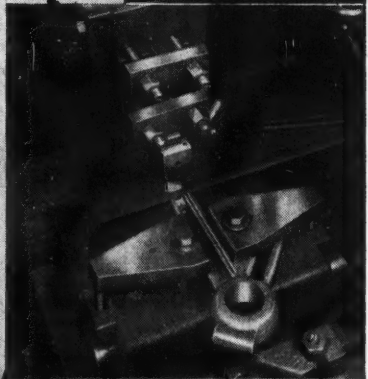
Accuracy of the Rockford Hy-Draulic Shaper ram stroke in maintaining the plane and length of the cut with precision accuracy, makes it the ideal machine for the job. High cutting and return stroke speeds result in fast production and lower costs.

Take a tip from the machine tool builders . . . compare and be critical of the machines you buy. When you do this, your choice in Shapers is bound to be a Rockford Hy-Draulic. Write for complete information and Catalog 1947.

ROCKFORD MACHINE TOOL CO. ROCKFORD ILLINOIS

SALES AND SERVICE OFFICES: Atlanta • Baltimore • Cambridge • Chicago
Cleveland • Dallas • Dayton • Denver • Detroit • Hartford • Houston
Indianapolis • Kansas City • Los Angeles • Milwaukee
Minneapolis • New York • Newark • New Orleans • Philadelphia
Pittsburgh • Richmond • St. Louis • Salt Lake City • San Francisco
Seattle • Springfield • South Bend • Syracuse • Tulsa • Worcester

4708



Because of Hy-Draulic design, Rockford Shapers give you speed, accuracy, and ease of operation in all types of shaper work. These elements combined mean lower costs in production or in tool room or maintenance work. Rockford Hy-Draulic Shapers are built in 12", 16", 20", 24" special, 24" and 28" sizes; Openside Shapers in 36" size.

Hy-Draulic

SHAPERS

PLANERS

SLOTTERS

SHAPER PLANERS



For **FASTER**
PRECISION HONING....

FULMER HONING MACHINE

THE Fulmer Honing Machine produces round, straight, smooth bores to working tolerances as close as $\pm .0001''$.

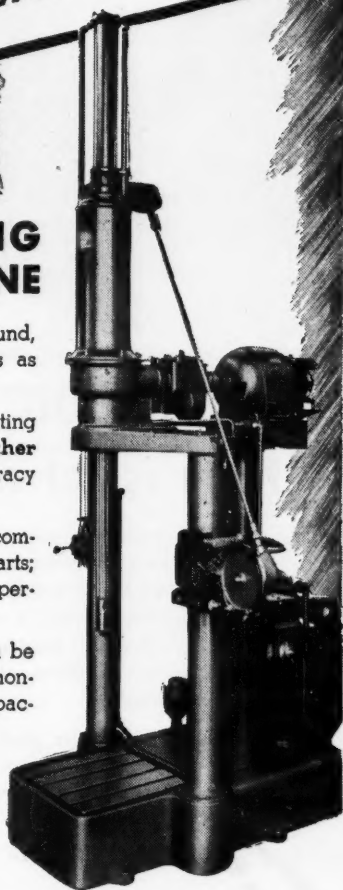
Due to a wide range of spindle and reciprocating speeds, it removes material faster than any other known method for a comparable degree of accuracy and surface finish.

It is ideal for finishing aircraft, Diesel, gas and compressor cylinders; connecting rods; supercharger parts; landing gear struts; recoil cylinders—wherever superfine surfaces and extreme accuracy are required.

Cylinders of either small or large diameter can be honed on the Fulmer Honing Machine. Standard honing capacity is up to 20" inside diameter. Larger capacity on special order. Maximum stroke 72". Any conventional honing heads can be used. Write for complete information.

C. ALLEN FULMER COMPANY

1233 First National Bank Bldg., Cincinnati, Ohio



FULMER
PRECISION PRODUCTION EQUIPMENT

DEALERS: A few attractive territories remain open. Write today!

ROD BORERS
HONING MACHINES
PISTON RING LAPPERS
CENTRIFUGAL CASTING MACHINES



We make DOUBLY sure that every tooth is cut clean and sharp

This precision machine automatically cuts the teeth of "American Swiss" Swiss-Pattern Files with a tolerance limit of $\pm .002$ -in. for many shapes. But notice how closely and carefully the operator is watching—he takes no chances of any imperfection. Machine accuracy plus experienced skill are your assurances of perfect files when you buy "American Swiss".

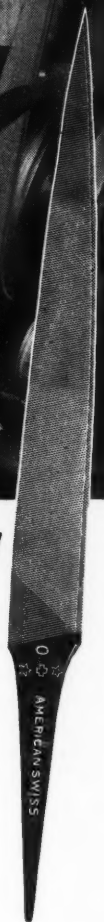
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AMERICAN SWISS FILE & TOOL CO., Elizabeth 1, N. J.

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American Swiss ★✚★

SWISS PATTERN FILES



AIR OILED

by NORGREN Lubricators

The fastest, most positive method known for lubricating air driven tools and cylinders.

Automatically inject clean oil into the airstream, creating an oil-air fog which travels with the air. This coats all moving parts of the tool or cylinder with protective film of oil.

Works only when the tool runs. Protects *all* the time against

- (1) excessive wear while tool operates**
- (2) rust and corrosion while tool is idle**

End lubrication troubles the NORGREN way . . . oil the air that drives the tool.

Write C. A. Norgren Co.
222 Santa Fe Drive,
Denver 9,
Colorado.

Norgren



Photo Courtesy:
Fosdick Machine Tool Co.
Cincinnati, Ohio

A RUTHMAN PUMP

to speed ✓ production

cut ✓ maintenance costs

give ✓ long service

Instantaneous coolant flow, split-second control from a trickle to full volume, speeds production in your metal-cutting operations. Pre-lubricated oversized bearings, one-piece dynamically balanced shaft, no metal-to-metal contact reduces wear and assures long trouble-free service for Ruthman Gusher Coolant Pumps.

Designed on centrifugal principles, Ruthman Pumps fit a wide variety of circulating pump problems.

Illustrated is a Fosdick No. 30 Jig Borer equipped with a ¼ Model UL-7120 Ruthman Gusher Coolant Pump.

Ask for Catalog 10-F

THE RUTHMAN MACHINERY CO.



1816 READING ROAD

CINCINNATI 2, OHIO

VERSATILITY is always at a premium in toolrooms. Heavy jobs, intricate work, awkward shapes, and the multiplicity of operations all challenge the versatility of toolmakers and their tools.

It is their versatility that makes South Bend Lathes so popular in toolrooms—their capacity for accurately machining anything from tiny instrument parts to heavy jobs like the one shown—plus their ability to perform efficiently a wide variety of machining operations. South Bend Lathes are made with 9", 10", 13", 14½", 16", and 16/24" swings. Write for catalog—specify size.

PRICES start at \$145.00, f.o.b. factory. PROMPT DELIVERY from local distributor. See classified phone book for name. TIME PAYMENT terms 25% down, balance 12 months. Moderate finance charge.

BIG JOBS TOO



Machining a planer drive shaft
on a 16" x 12' South Bend Lathe.



Building Better Lathes Since 1906

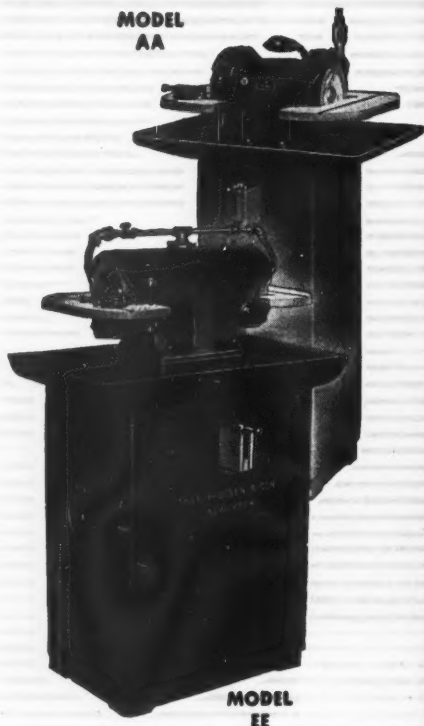
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427 EAST MADISON STREET • SOUTH BEND 22, INDIANA

PROSSER

Carbide Grinders



MODEL
AA



MODEL
EE

For fast, efficient rough grinding and fine finishing of carbides, stellite, high speed steel, and other modern tools, install Prosser Carbide Grinders. Their rugged construction, modern design, and ease of operation insure long, dependable and profitable service.

Prosser Carbide Grinders are built in bench and floor models of several capacities, for wet or dry grinding. Attachments for chip breaker and drill grinding.

Important features include:

- Quick-acting indexing tables.
- Adequate wet-grinding equipment.
- High grade ball bearing spindles.
- Oversize wheels, giving longer wheel life, and permitting grinding of larger tools.
- Moderate price.
- Prompt deliveries.

Write for details

Thomas Prosser & Son

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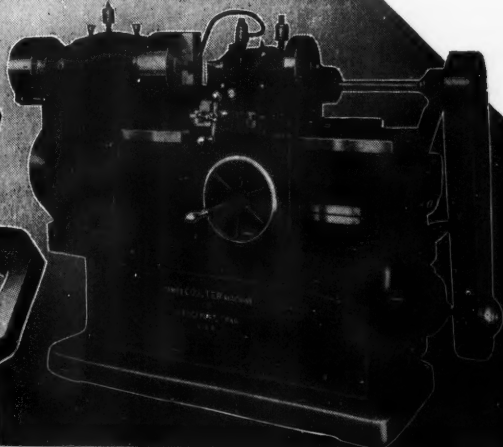
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the Standard COULTER "HT" Thread Milling Machine
IS THE MACHINE FOR YOU!

- ★ Any number of Lands eccentric or con-eccentric relief can be produced. Dies from $\frac{3}{8}$ " up to 2"
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- ★ Can thread round, square and inserted chaser dies
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PRODUCTION
MACHINES
SINCE 1896



The James **COULTER** *Machine Co.*
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MEN WHO KNOW

Specify "Republic"

Inspectors and Production men whose first consideration is value, invariably pick **REPUBLIC GAGE** as their source for gages.

For years **REPUBLIC** has enjoyed top rating as manufacturers of thread gages with "THAT UNSEEN EXTRA QUALITY." May we serve you?

RELY ON



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DETROIT 21, MICHIGAN



*It's New...
Free-Operating
...Accurate!*

**IT'S A LEMPCO
PRECISION
ANTI-FRICTION
DIE SET**

For increased die life . . . faster production . . . greater economy . . . put Lempco Anti-Friction Die Sets to work for you.

Lempco Die Sets are equipped with ball or roller bearing guide pins. As a result, dies can be set up by hand without the use of hammers, mauls, jacks or pry bars. This eliminates production delays caused by accidents to dies and punches . . . saves up to 60% in matching up and assembly time . . . means extra profit for you.

Lempco Anti-Friction Die Sets have been run over long periods on a conventional press as well as on special high speed presses. To assure positive accuracy, bearings have pre-load of .0015". All surfaces including extremely long bosses are ground to exceptionally close tolerance.

Place your order today and make sure you cash in on all the money-saving features offered by Lempco Precision Anti-Friction Die Sets.

LEMPCO

5717 DUNHAM ROAD, BEDFORD, OHIO

● Write for "Facts About Lempco Precision Anti-Friction Die Sets." It's a fully illustrated catalog which lists all the advantages Lempco Die Sets have for you

MARK IT for MARKET

MODEL
175
HYDRAULIC



Modern Marking Machines now enable most manufacturers of metal components to identify their products at trifling cost.

**TRADE MARKS—
MANUFACTURERS—
PART NUMBERS—
PERMANENTLY ROLLED
ON YOUR PRODUCTS
WILL HELP YOU MARKET
THEM.**

Send prints of parts, showing required marking and its location on part with hourly production for free recommendation.

*Illustrated at the left is
Model 175 Hydraulic
Marking Machine.*

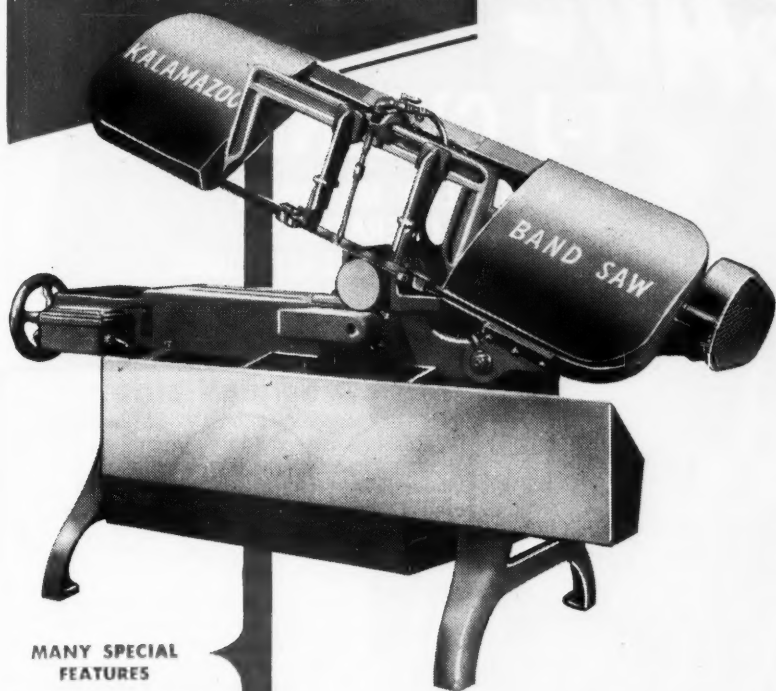
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GEO. T. SCHMIDT, INC.

**1806 W. BELLE PLAINE AVE.
CHICAGO • 13 • ILLINOIS**

KALAMAZOO



MANY SPECIAL FEATURES

- ★ Cuts tubes, rods, angles, heavy round or flat stock.
- ★ 8"x16" throat handles 95% of all cut-off work.
- ★ Entirely enclosed saw frame for safety.
- ★ Blades mount from top for easy servicing.
- ★ Cutting action always visible from above.
- ★ Interchangeable motor mount takes any motor in emergency.
- ★ Off-the-floor built-in coolant.
- ★ Portable—for plug-in operation anywhere.

Kalamazoo Metal Cutting Band Saw

BIG SAVINGS in cutting off metal to lengths. Extremely fast because of continuous cutting action—automatic operations and quick set-up. Cuts with precision accuracy.

Wet Model suitable for production cutting at highest speeds. Dry Model for occasional cutting. Requires only a small investment to **MODERNIZE YOUR METAL CUTTING.**

A Product of - - -

MACHINE TOOL DIVISION
Kalamazoo Tank & Silo Co.
KALAMAZOO 16, MICHIGAN

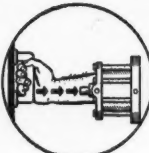
SAVE LABOR

with

T-J CYLINDERS

- ★ SIMPLIFY MACHINES
- ★ SAVE OPERATIONS
- ★ DO PUSH-PULL-LIFT JOBS

Automatically!



More and more today—industry is saving labor by applying T-J Air and Hydraulic Cylinders to operations of all kinds where pushing, pulling, lifting or mechanical control is needed. Available in many standard sizes and styles... 100 lb. or 50,000 lb.... both cushioned and non-cushioned types. Backed by 30 years of know-how... T-J engineered to do the job better and cut costs! Write today for catalogs.

The Tomkins-Johnson Company, Jackson, Mich.

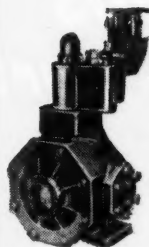
FOR TOUGH JOBS SPECIFY



TOMKINS-JOHNSON

RIVETORS... AIR AND HYDRAULIC CYLINDERS... CUTTERS... CLINCHERS

RACINE HYDRAULICS



Racine Variable Volume Oil Hydraulic Pump with solenoid operated 2-pressure control. These pumps supply the power for shearing, punching and trimming spring leaves that are fabricated by this press. Fifty foot bars are fed into one end of the press. A complete spring is fabricated on each cycle.

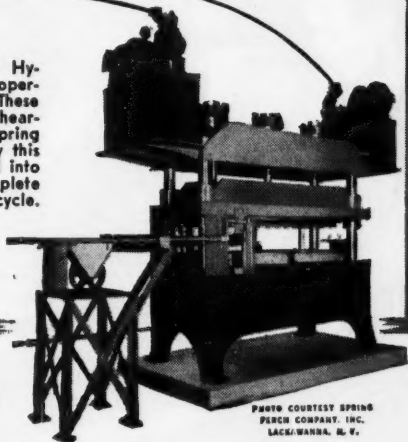


PHOTO COURTESY SPRING
PUNCH COMPANY, INC.
LACK/WARRA, N. Y.

Smooth Oil-Cushioned Action Under Variable Volume Control

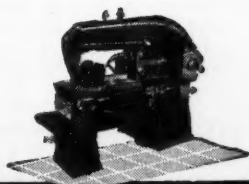
The built-in Variable Volume feature of RACINE Pumps simplifies your hydraulic circuits, reduces piping and eliminates the use of relief and by-pass valves. Your machine runs shock-free, cool and uses less horsepower. Aggregate cost of complete hydraulic assembly is substantially reduced.

RACINE users now include manufacturers of Presses, Die Casting and Plastic-Molding Machines, Drilling and Woodworking equipment, Lifts, Elevators and many additional types of machines. An impressive number have standardized on RACINE's full line of Variable Volume pumps, Sleeve Type valves and Hydraulic pressure boosters.

Let us prepare for you, a full outline of the special advantages your product can present when RACINE Hydraulic Equipment is used. Make our Variable Volume feature a part of your machine. RACINE hydraulic engineers will give you full cooperation without cost or obligation. Write today for our Free catalog P-10-C. RACINE TOOL AND MACHINE COMPANY, 1770 State St., Racine, Wisconsin.

Racine Hydraulic METAL CUTTING MACHINES

Featuring open front design
—simple one lever control
—smooth oil-cushioned progressive feed. Cut any metal from light tubing to structural shapes and billets of tough tool steels. Models in all price ranges. Capacities 6" x 6" to 20" x 20". Write for complete catalog No. 12.



RACINE

STANDARD FOR QUALITY AND PRECISION



With Two DI-ACRO BENDERS

A difficult production problem of forming two bends in a long length of tubing was solved by "teaming up" two DI-ACRO Benders as illustrated. This dual-forming arrangement saved installation of special machinery. Two accurately formed bends are obtained in one operation—without distortion of the tube and at a cost competitive to power operated equipment. More than 300 pieces are completed per hour—600 individual bends.

"DIE-LESS DUPLICATING" Often Does it Quicker WITHOUT DIES

This is but one example of how DI-ACRO precision machines—Benders, Brakes, Shears, Notchers, Rod Parters, Punches—can accurately and economically duplicate a great variety of parts, pieces and shapes, without die expense. Write for catalog—"DIE-LESS DUPLICATING."



◀ DI-ACRO is pronounced "DIE-ACK-RO".



O'NEIL-IRWIN MFG. CO.

306 EIGHTH AVE., LAKE CITY, MINNESOTA



Actually There's NO TRICK to Reducing Milling Costs!

Your milling costs can be cut to a minimum by using Kemp Smith Standard Attachments to increase the productiveness of your standard milling machines.

57 years of specialized experience has given Kemp Smith the necessary "know-how" to turn out dependable, precision-built Attach-

ments, Arbors and Accessories.

Kemp Smith Standard Attachments are made to perform the most delicate milling operations with both speed and accuracy. Why not investigate the cost-saving possibilities of these sturdy, time-proven tools? Write, today, for literature.

KEMPSMITH MACHINE CO. • MILWAUKEE 14, WIS., U. S. A.

KEMPSMITH

Precision Built Milling Machines Since 1888



PAID FOR ITSELF

in 3 weeks

**IN THREE WEEKS THE INCREASED PRO-
DUCTION BROUGHT ABOUT BY THIS
INGERSOLL-RAND SCREW DRIVER
PAID FOR THE COST OF THE TOOL**

● The "Multi-Vane" air motor makes a smooth, cool-running screw driver. A Cushion Clutch permits accurate torque adjustment. An Engaging Clutch permits continuous running of the motor as the tool is lifted from assembly to assembly.

Long life combined with light weight as well as versatility and safe, easy handling are inherent in all I-R Air Tools. These features reduce maintenance costs and increase output to such an extent that all I-R Air Tools soon pay for themselves.

Ingersoll-Rand

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• ROCK DRILLS • AIR TOOLS • OIL AND GAS ENGINES •

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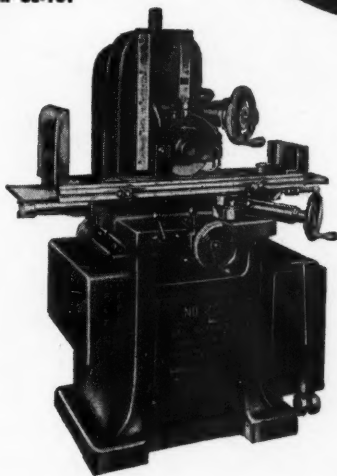
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ENGINEERS ...**

Specify

**GRAND
RAPIDS
GRINDERS**

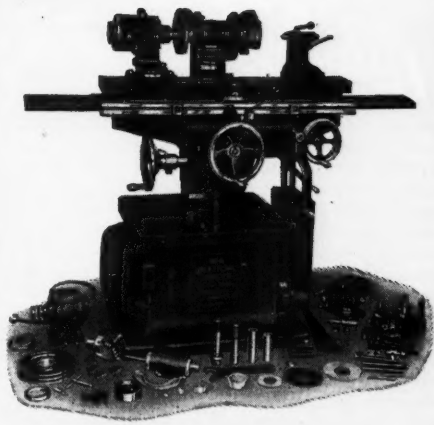
- No. 25 Grand Rapids Hydraulic Feed Surface Grinder

Complete Information in
Bulletin QL-101



- No. 4 Grand Rapids Universal Cutter and Tool Grinder

Complete Information in
Bulletin No. 1048



What "GRAND RAPIDS" Quality Means:

G & L cast their own close-grained gray iron, machine all parts to micrometric tolerances, and precision-assemble grinding machinery of unsurpassed performance. *Grand Rapids* means *top* quality in grinding machinery.



GALLMEYER & LIVINGSTON CO., 308 STRAIGHT AVE., S.W., GRAND RAPIDS 4, MICHIGAN

- Every Grand Rapids Grinder, large or small, has every essential feature for fast, efficient, low-cost production.

For the manufacturer of small sized products, Grand Rapids No. 25 and No. 4 Grinders will solve the Tool Room grinding problems on dies and cutting tools. Grand Rapids Grinders are built in many sizes for many grinding jobs.

DoALL

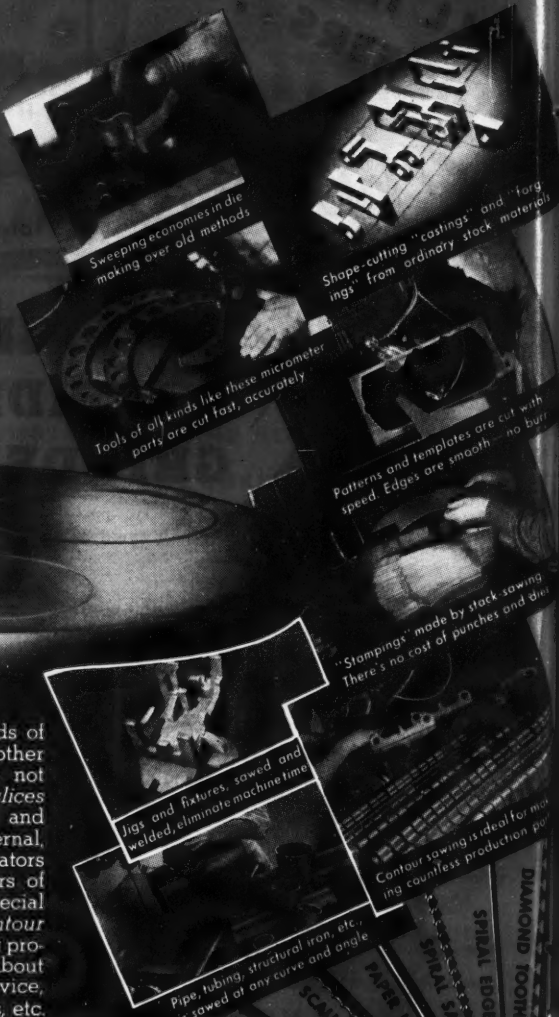
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Contour Sawing

INDUSTRY'S MULTI-PURPOSE PROCESS
FOR FASTER LOW-COST PRODUCTION
... FOR CUTTING ALL MATERIALS

**19 Models**

Contour Sawing saves industry thousands of man-hours every day. It differs from other machine-tool processes in that it does not waste time "whittling" stock to shape but *slices* off unneeded parts - even hard alloys and tungsten carbide. Makes internal or external, curved or straight cuts at any angle. Operators trained in few days - do not need years of machinists' experience. With many special blades and infinitely variable speeds, *Contour Sawing* cuts anything and makes amazing production economies in all industries. Ask about the special DoALL customer research service, free movie for industrial groups, schools, etc.



Sweeping economies in die making over old methods

Shape-cutting "castings" and "forgings" from ordinary stock materials

Tools of all kinds like these micrometer parts are cut fast, accurately

Patterns and templates are cut with speed. Edges are smooth - no burrs

"Stampings" made by stock sawing. There's no cost of punches and dies

Jigs and fixtures, sawed and welded, eliminate machine time

Pipe, tubing, structural iron, etc., is sawed at any curve and angle

Contour sawing is ideal for making countless production parts

The **DoALL** Company

Reg. U.S. Pat. Off.

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IN 36 COUNTRIES

DOALL STORES
IN KEY CITIES

Des Plaines, Illinois
Cable Address: DoALL, Des Plaines

Blades for Every Purpose

Iron	Steel	Copper	Brass	Aluminum
Forgings	Stainless steel	Tools	Machine parts	Tungsten carbide
Castings	Heat-treated steel	Alloys	Wood	Plastics
Heat-treated steel	Laminates	Hard-pressed board	Cloth	Ceramics
Plastics	Cloth	Ceramics	Glass	

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SPIRAL EDGE
SPiral SAW
WATER KNIFE
SCALLOP KNIFE
SKIP TOOTH
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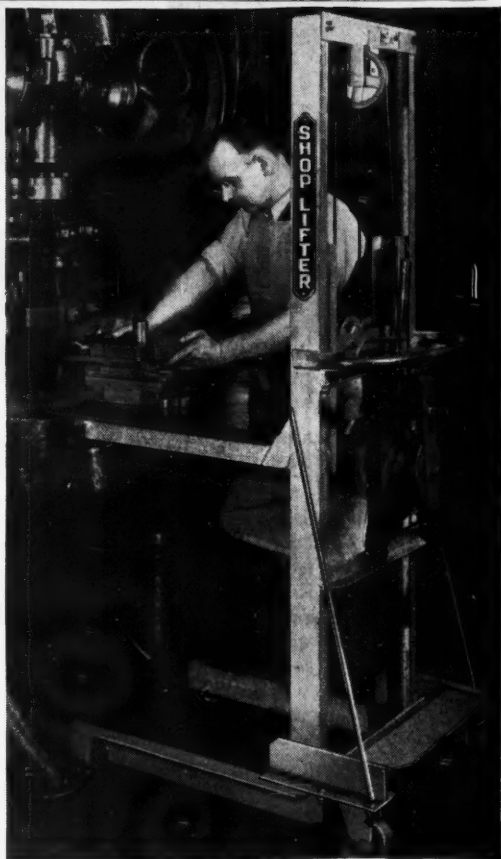
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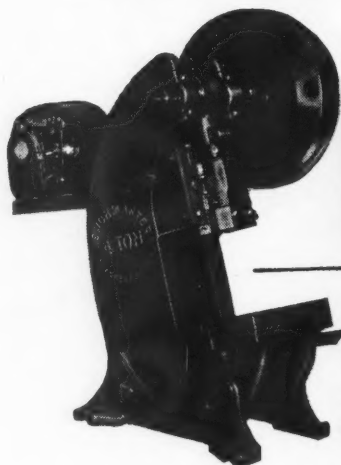
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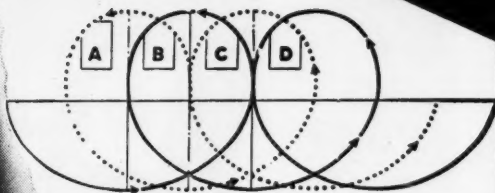
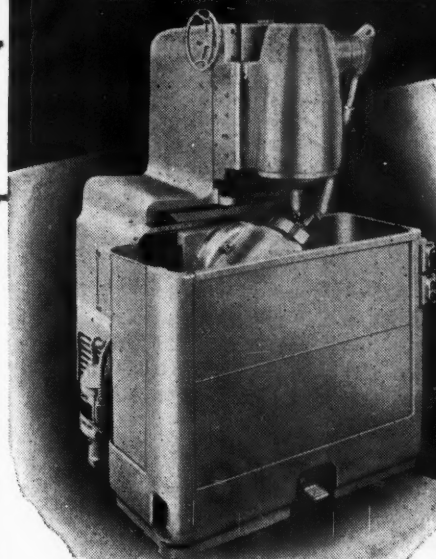
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BULLETIN NO. 92

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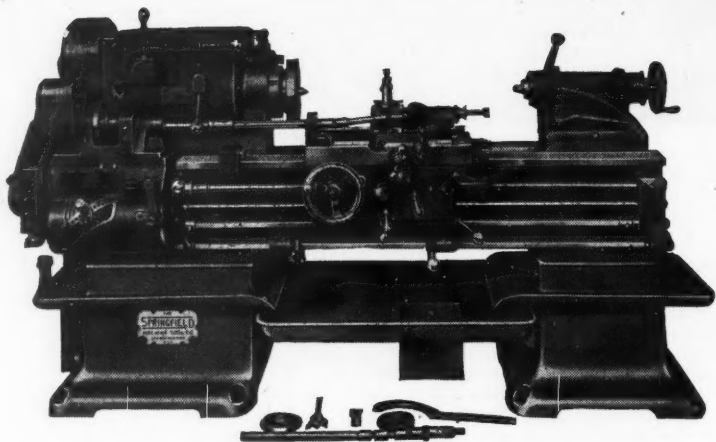
Part: Bearing Race (Railroad)
Material: S.A.E. 52100 Steel
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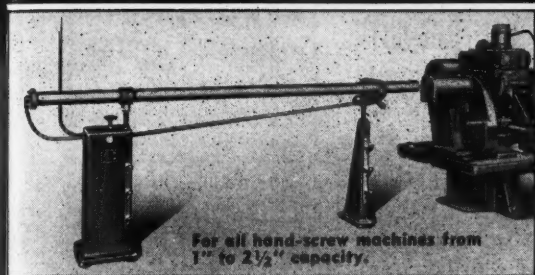
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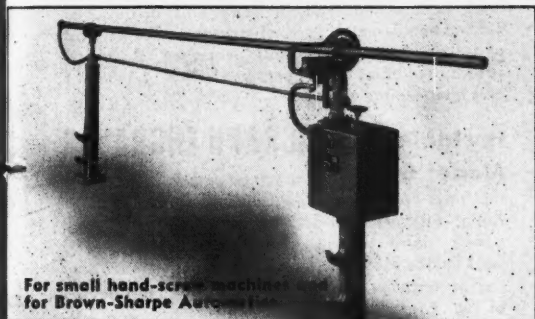
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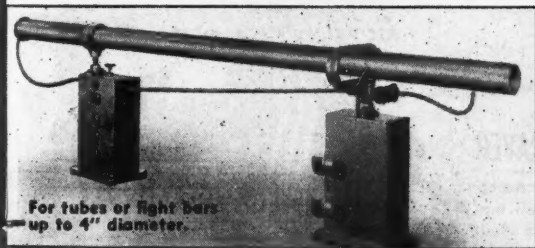
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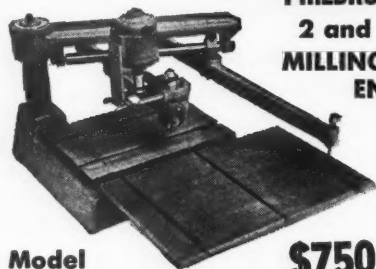
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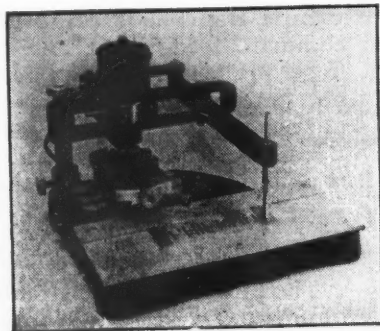
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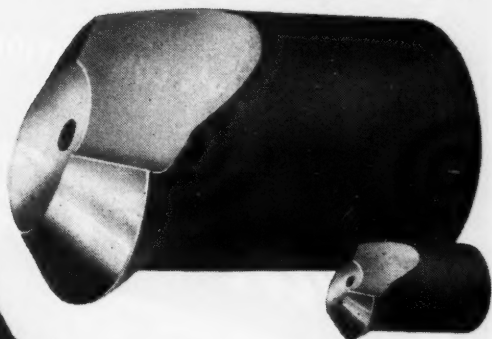
For details see page 215
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*In a recent survey by a leading metal working magazine, one out of every five plants stated carbides would be used for 70% or more of their new machine tooling. One out of every two indicated 50% or greater carbide usage.

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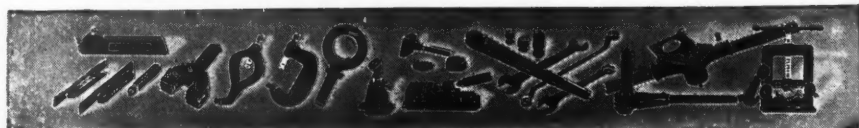
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MODERN Machine Shop

NOVEMBER, 1947

VOL. 20, No. 6

CINCINNATI, OHIO

This Month

For the feature article in this month's issue, "Gerry" Stedman has written for us a description of some of the special tooling used in the manufacture of the gas refrigerator made by Servel Inc., Evansville, Indiana. The most interesting of these tools is the condenser fin assembly machine, and the description of this machine will be well worth reading by everyone who has anything to do with tool design.

For the owner or superintendent of the plant that is just graduating into "big time," the discussion of the process engineer's place in the manufacturing organization, page 134, will be found both useful and enlightening. The person to whom the process engineer's job is assigned must be carefully selected, but a good process engineer will be "worth his weight in gold" to any works manager or plant owner. This article explains the process engineer's duties and presents suggestions for forms to be used for making the various estimates and reports.

The second and concluding section of E. R. Yarham's article "The Rubber Die Press as a Tool for Forming Aluminum" will be found on page 154. Although Mr. Yarham's discussion of the subject is based upon British practice, British practice differs very little from American practice. To manufacturers who can make use of the rubber die press, the methods outlined will be found satisfactory, and to American tool engineers who are familiar with the American methods, Mr. Yarham's discussion will afford an opportunity for comparison of American with British methods.

Although about 186,000 people saw the Machine Tool Show which was held in Chicago several weeks ago, we realize that many of our readers didn't have this opportunity and accordingly we are including, beginning on page 186, a "report" on some of the interesting machines and tools that were on display at the show. In some cases it was difficult to get pictures of the machines because every interesting machine—and that meant most of them—was surrounded by a group of industrialists, engineers, and plant executives who were there to post themselves on the newest in metal-manufacturing equipment.

Following the report on the Machine Tool Show, on page 220, will be found descriptions of many new machines which were presented for the first time at the Machine Tool Show. Complete descriptions of any of the machines shown in this section can be obtained by writing the manufacturer at the address given in the description.

The "Ideas from Readers" section contains a few good wrinkles this month and the "New Shop Equipment" section presents a number of new machines that are now ready for the market.



Fig. 1—W. L. O'Brien, Servel Corporation, demonstrating automatic stopping device applied to condenser assembly machine.

In this article the author describes and illustrates some of the special tools that have been designed by Servel tool engineers.

Special Tooling For Servel Gas Refrigerators

By GERALD ELDRIDGE STEDMAN

THE Servel gas refrigerator is designed upon the "absorption" principle. Instead of the usual mechanical compressor, the refrigeration unit consists principally of a system of seamless steel tubing in many sizes, shapes, diameters and contours. Of the 1149 parts in the unit, 54 are sections of tubing involving a total length of 108 feet $4\frac{1}{8}$ in., connected by some 240 gas-tight weldments. Servel has the longest conveyORIZED welding line in the world.

These tubing sections are used to connect such components as the generator, the liquid heat exchanger, ab-

sorber, condenser, rectifier, gas heat exchanger, and evaporator. The condenser and certain other components are heavily finned, as shown in Fig. 3, requiring tight fits and close parallelism within tolerances of 0.003 in. or less. Previous to the development of the equipment described in this article, the finning operation was accomplished by hand.

The intricacies of this type of tube bending are quite peculiar to Servel. In the earlier days of its operations the company sought without success to find standard machine tools with which to perform the bending opera-

tions. Inasmuch as such machines seemed unavailable, the bending operations were performed by the old-fashioned laborious methods. This was the situation when Louis Ruthenburg became president of the company in 1934. Mr. Ruthenburg immediately recognized that hand work of this type was not only wasteful of material but that it also resulted in low production and high manufacturing costs. Accordingly, he immediately took steps to rectify the condition.

A genius in tool engineering whom he had long known was W. L. O'Brien, who started his career with "Boss" Kettering at National Cash Register many, many years ago and had since had many years of experience in all types of tool design. Mr. Ruthenburg was able to persuade O'Brien to join with Servel as tool designer in charge of special assignments and Mr. O'Brien immediately tackled the job of developing a condenser fin assembly machine.

The condenser consists of three U tubes to which are assembled fins, each of which has six holes or "hubs" machined to fit tightly onto the U tubes. After the fins have been assembled to the tubes, end bends are welded to the open ends of the tubes, thus completing the circuits. The number of fins employed in a condenser assembly is from 65 to 102, depending upon the unit model. A unit assembly is

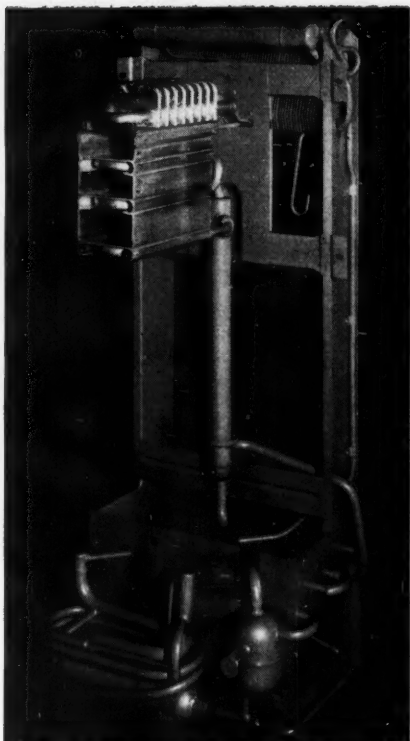


Fig. 2—Servel gas refrigerator unit assembly.

shown in Fig. 2, and a condenser fin assembly in Fig. 3.

Mr. O'Brien also designed the automatic rotary U tube bending machine, shown in Fig. 4, by which hairpin bends are accomplished. The bender handles all diameters of tubing up to $\frac{3}{8}$ in. and accomplishes

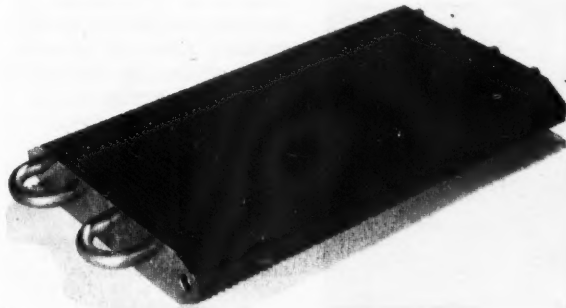


Fig. 3—Condenser fin assembly for Servel gas refrigerator, showing construction.



Fig. 4—Hydraulic automatic rotary U-tube bending machine in operation.

close bends, which is done by the use of an inside arbor. The machine is loaded by the operator, after which it automatically clamps, bends, unclamps, ejects and resets the machine.

The machine is known as a three-station tube bender. The operator stands in one position and feeds the

tubes to each station as the table revolves. Die blocks, designed to produce the particular kind of bend or angle desired, are made to fit the tube and these blocks are located on the machine table. The tube is placed over a stationary arbor, then the tube is clamped to the die and the spindle revolves to form the bend. Then the clamp is released, the tube is ejected, and the spindle is revolved to the starting position to receive another tube. A close-up view of the die blocks is presented in Fig. 5.

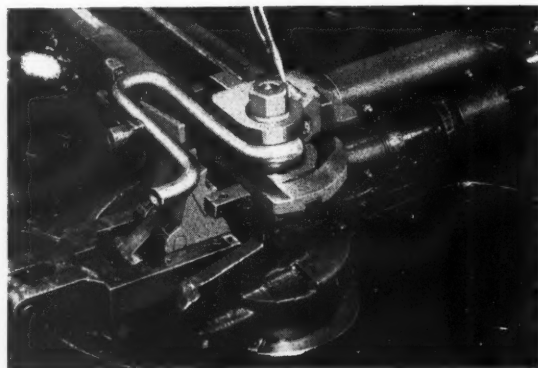


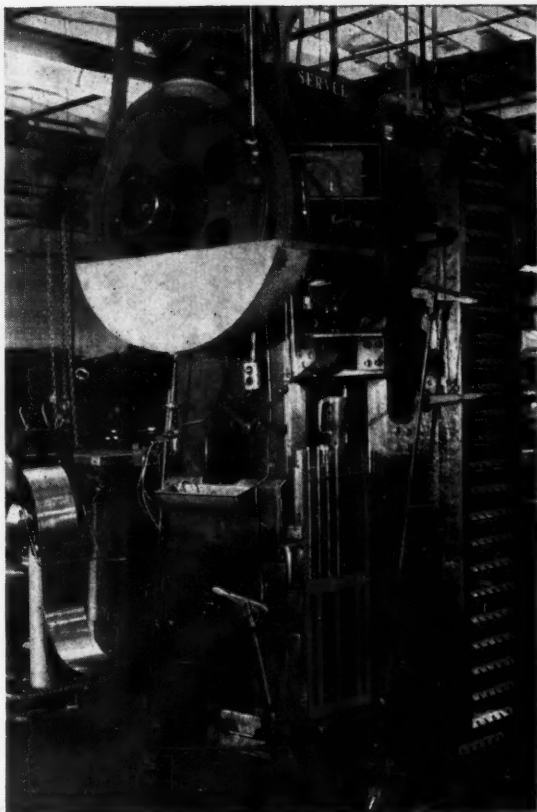
Fig. 5—Close-up view of rotary tube bending machine showing tube in position on die blocks for bending.

Fig. 6—Condenser fin assembly machine, designed by W. L. O'Brien and built upon a standard punch press.

Before the present condenser fin assembly machine was designed the job was done by rough forming the hub at one station, piercing it at another, and reforming the hub at another. Six girls were employed to place the fins in a spacing fixture, after which two men operators placed the fixture in a press by which the tubes were forced into the fins. If the fins were too tight the tubes would bend; thus the method produced an excessive amount of scrap. One man was employed continuously removing the fins from the bent tubes for scrap. In all, ten people were required to complete the operation.

The present condenser fin assembly machine shown in Fig. 6, was designed to utilize a standard punch press. A compound die forms the hubs from coiled strip stock. As the fin is completed, it is located over the tubes where a chain conveyor leaves the fins properly placed. The fins are placed onto the tubes by an ingenious arrangement of paddles that are hinged to a chain conveyor. The operator equips each tube with a bullet nose pilot to guide the fins as shown in Fig. 7. As the paddles contact the fins when they are over the pilot a cut-off severs the fins and the paddles force the fins down into place.

After each paddle has pressed its fin



into position, spring action forces it to fly up out of the path of the condenser. The paddles are of the bell crank type and the pivot spindle rides in a vertical channel. The horizontal arm presses the fins onto the tubes while the vertical arm of the bell crank rides on a vertical slide. At the upper end of the vertical arm is a hardened block which, when it rides off the vertical slide, falls back and thus takes the horizontal arm up and out of the path of the condenser. The vertical slide is indexed upward by pawl action to provide proper spacing for the fins and is at rest when the vertical arm drops off.



Fig. 7—The operator inserts a bullet nose pilot into the end of each tube to guide the fins.

fin assembly machine, shown in Fig. 8, is double and is made to shuttle from one side of the conveyor to the other; thus an operator can remove the finished condenser assembly and reload one fixture while the machine is assembling the fins to the tubes in the other. When the machine stops, which is automatic, the operator slides the loaded fixture into working position and simultaneously pushes the fixture containing the finished condenser out into reloading position on the other side.

At no time are there more than six fins being pressed onto the tubes at the same time; this assures the fabrication of a tight hub without danger of bending the tubes.

The holding fixture of the condenser

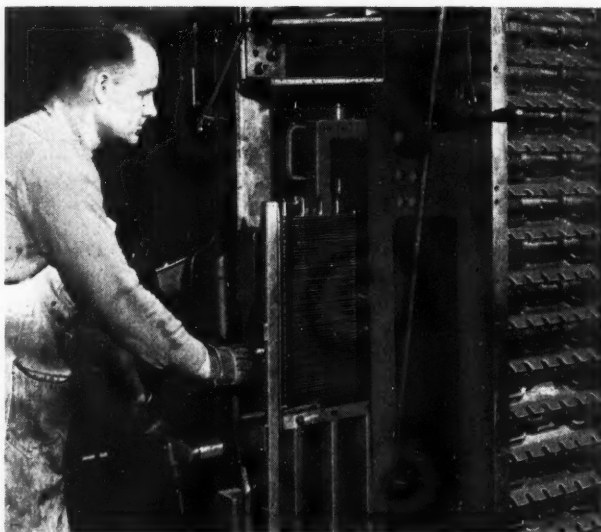
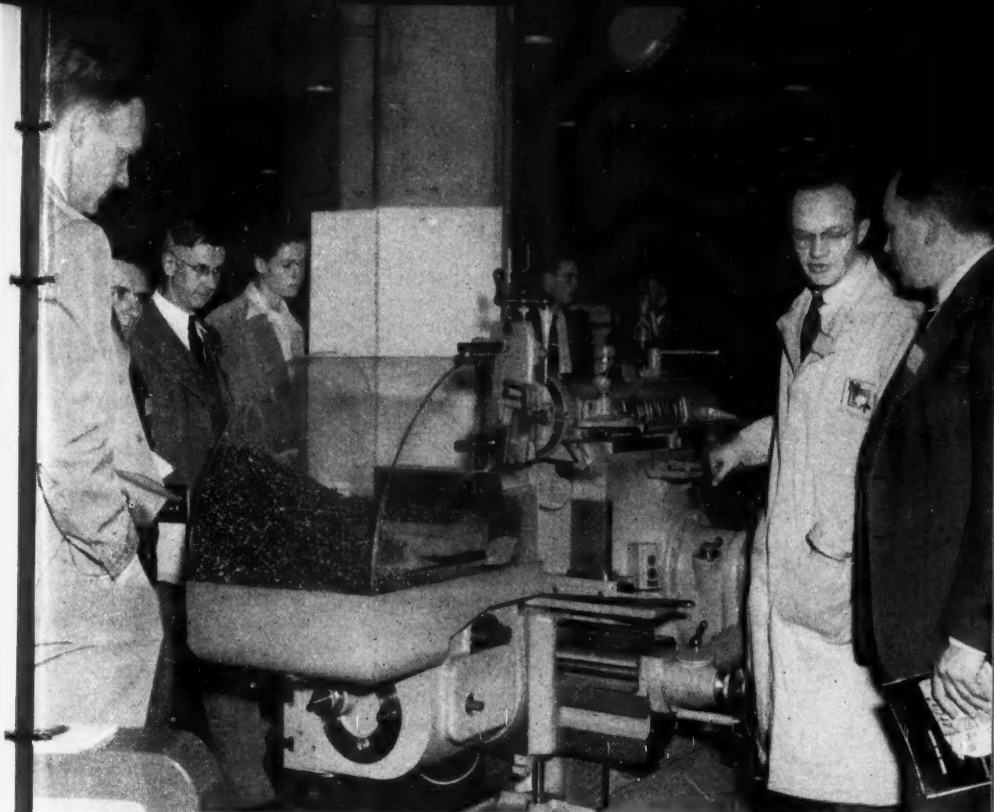


Fig. 8—Here the operator is removing a condenser fin assembly after completion. As the double fixture is pulled to one side for reloading one station, the other station is pulled into working position in the machine.



★ Demonstration at Machine Tool Show, Chicago.

CARBIDES PAY . . . with the CINCINNATI TOOL LIFTER

...on CINCINNATI SHAPERS



The rigidity that dampens vibration; the power for the toughest steels; the speed for thrifty carbide performance—all are found in Cincinnati Heavy Duty Shapers.

Whether it's alloy steels, chilled castings, chipper blades, or glass molds—carbides on Cincinnati Heavy Duty Shapers are cutting manufacturing costs.

★ This Cincinnati Shaper, equipped with a Cincinnati Tool Lifter and carbide tools, operated steadily at 200 strokes a minute at the Machine Tool Show in Chicago. During this ten-day demonstration the shaper was producing a superior finish—quickly and efficiently—on Heppenstall grade B die blocks.

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO U.S.A.

SHAPERS • SHEARS • BRAKES

The double fixture permits the machine to be in operation approximately 98 per cent of the time; the 2 per cent time loss is used in sliding the fixture from one side of the press to the other to position it for the succeeding operations. However, by this method one



Fig. 9—Close-up view showing paddle mechanism by which the fins are pressed onto the tubes. After each paddle has pressed its fin into position, the paddle swings out of the path of the condenser.

man obtains the same production that formerly required ten people and accomplishes it with a minimum of scrap. Material savings per year by this method over the previous method amount to around \$15,000.

The sequence of operations involved in the production of a condenser is as follows:

A roll of fin stock is positioned on the reel, from which it is fed by hand through oiled rolls and thence through a trimming and stitching attachment and so on to the die. After the hubs have been formed the stock is automatically fed to the cut-off attachment where the fins are assembled to the tubes by means of the paddles. When the correct number of fins have been pressed on the tubes, the machine automatically stops. Working at the rear of the machine, or on the side opposite that into which the stock is fed, the operator would be unable to know when the stock had run out, especially if the roll were broken in one or more places.

To stop the machine in such a contingency, Mr. O'Brien designed a mechanism consisting of weights, equipped with rollers to ride on the stock, and mounted upon a shaft in such manner that, as the end of the stock passes under the rollers, the weights drop just enough to open an air valve which controls a cylinder which unlatches the foot lever which is latched down to keep the machine running, thus stopping the machine. The reason for having two weights and two rolls is that sometimes two strips of stock are fed through the machine simultaneously.

When the machine is stopped by runout of stock the operator sets a new roll of stock in position and trims the end to a predetermined length set by the trimming device shown in Fig. 10. Then he laps the end of the new roll onto the end of the stock that has been trimmed. This done, he moves a lever which brings down a set of punches, each of which pierces only half a hole in the lap. The half hole permits the projecting sections between the half holes on one piece of stock to enter the half holes in the other piece, thus "stitching" them together. This done, the operator starts the press and when the stitched part reaches the fin cut-



Why say more?

• Courtesy Heald Machine Tool Company

Accuracy always appealed to this old friend—The Heald Machine Tool Company. Here they are boring, facing and reaming numerous holes in a 1360-lb. casting.

They say, and we quote: "We bought this Cincinnati Bickford Super-Service Radial Drill to increase war-time production. We also have ten large and a flock of smaller ones. Why say more?"

Cincinnati Bickford Super-Service Radial Drills are always accurate, dependable tools, highly productive and profitable in the shop.

Write for Bulletin R-24A.

See our condensed Catalog in Sweet's File.



Equal Efficiency of Every Unit
Makes the Balanced Machine

THE CINCINNATI BICKFORD TOOL CO. Cincinnati 9, Ohio U.S.A.



Fig. 10—The end of the new roll of stock is trimmed with the aid of the trimming device shown here.

off, it is severed through the stitching and the lapped-over ends fall into the scrap.

The tools described here are excellent examples of the manner in which American tool engineering has made it possible for America to out-produce the world.

"Humidity Control Is More Important In Your Plant Than You May Realize"

is the title of an eight-page booklet issued by the Surface Combustion Corp., Toledo 1, Ohio, which explains the principle of operation and presents details of application of the Kathabar System of Selective Humidity Control for industrial processing applications. The booklet shows various methods commonly used in dehumidification, compared with the direct cycle of selective dehumidification-humidification provided by the Kathabar System. The flexibility of the operation is illustrated by a chart presenting the various temperature humidity conditions available from the system as it might be applied to one large processing plant requiring different humidity conditions for processing, packaging, storing, personal comfort, and so on. Numerous installations are illustrated, including those for providing dry blast for foundry cupolas, processing chemicals, packaging and storage of highly finished steel parts, paper testing, and for research laboratories. Copy free upon request.

"Grits and Grinds" Vol. 33, No. 6. Part VI of Dr. L. P. Tarasov's article on "Injury in Ground Surfaces" provides the lead feature in this issue of the technical house organ published by the Norton Co., Worcester 6, Mass. Metallurgical and other factors relating to injury in ground surfaces are discussed in this installment.

The center spread of the booklet contains an illustration and description of the new plant now being constructed by Norton for manufacturing vitrified grinding wheels. Other short articles on gear, cylindrical, and tool grinding are also included in the booklet. Copy of "Grits and Grinds" Vol. 33, No. 6 free upon request.

National Apprenticeship Program. In answer to the demand for information on the occupations in which apprentice training is given, the Apprentice-Training Service, U. S. Department of Labor, Washington 25, D. C., has published a new and enlarged edition of the "National Apprenticeship Program" which covers the subject in detail. In addition to an explanation of the operation and development of apprenticeship in American industry, the pamphlet contains a list of 110 basic trade classifications in which apprenticeship programs are established, the various occupations under each classification with the time required for training, as well as criteria and procedure for determining the apprenticeability of an occupation.

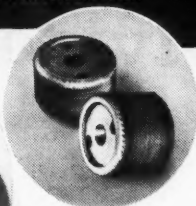
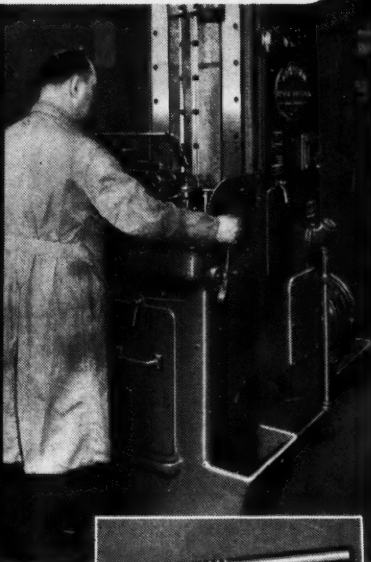
How apprenticeship programs are established and conducted today and the functions of Apprentice-Training Service, State apprenticeship agencies, National, State, and local apprenticeship committees are also explained. For the benefit of individuals desiring further information on apprentice training in the different industries, the pamphlet contains a list of over 20 technical and non-technical pamphlets. Copy free.

AN ALL-PURPOSE BROACHING MACHINE

That's What You Get With *American's 3-Way*

A machine that gives you pull down, push down, and surface broaching; a machine that can be used for a wide variety of internal and surface broaching jobs—that's American's exclusive 3-Way Vertical Hydraulic Broaching Machine. You can change over from one type of broaching operation to another quickly. It requires only replacement of fixture and broaches, and addition of pull head and lugs.

For all types of broaching machines, for all kinds and sizes of broaches, for tooling and fixture design based on more than a quarter century of broaching experience—look to American, the one source for all your broaching needs. For the best in broaching—machines, tools, and engineering—see American first!



For broaching the holes in laminated commutator parts an American T-8-24 3-Way machine equipped with special broach retriever unit, foot switch, and electric controls was provided.

With the above extra equipment the operation is semi-automatic. Operator loads two parts and starts retriever unit, which lowers broach pilots through work into automatic quick connecting pull heads. Machine slide pulls broaches through work, operator unloads and starts return of machine slide by foot switch. At end of return stroke he loads two more pieces and begins cycle again.

A new circular tells the complete story of American's Type-T 3-Way broaching machine. A letter or post card will bring it to you by return mail. Write today for Circular 100.



To illustrate the wide variety of broaching jobs possible on this all-purpose machine, the Standard T-8-24 is pictured above.

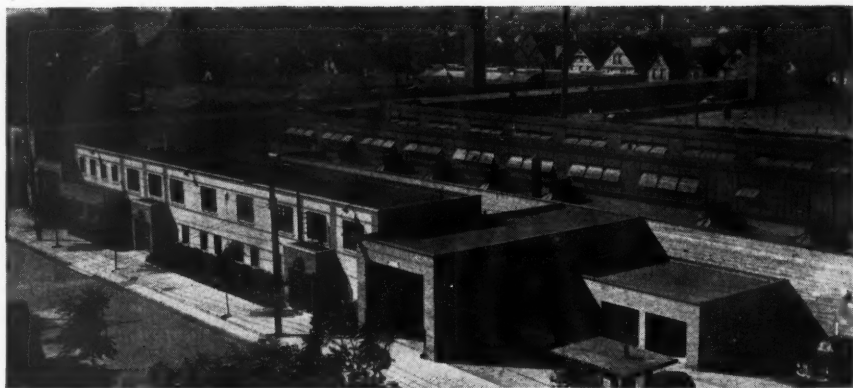
This machine is operated by manual controls and the broach holders are mounted directly on the main machine slide. The operation is surface broaching the teeth in a round bar with the tooling designed to automatically clamp and eject the broached parts.

American
**BROACH AND
MACHINE CO.**

ANN ARBOR, MICHIGAN

**BROACHING MACHINES
PRESSES
BROACHING TOOLS
SPECIAL MACHINERY**





Plant of S. K. Wellman Company, Cleveland, Ohio

Process Engineering Pays Dividends

The procedure employed by the S. K. Wellman Company, outlined in this article, will expedite production in a plant of practically any size—large or small.

By CHARLES DELMAR TOWNSEND

Industrial Engineer

PROCESS engineering departments are most frequently found in large manufacturing organizations that are highly organized, but smaller companies may also benefit from the establishment of such divisions. A process engineering department may consist in the smaller organization of perhaps one or two men, or as many as ten or twelve persons in the larger company in which the production facilities include a wide variety of operations cov-

ering the manufacture of a diversified group of products.

The members of a process engineering department should be well grounded in engineering practices and should be acquainted with the manufacturing methods and processes employed in many different industries. Such a background aids the process engineer to quickly analyze each problem that is presented to him and choose the most economical approach to the solution.

Basically, process engineering is the science that deals with the selection, perfection and proper use of all production processes and equipment used throughout the plant in the production of the firm's product. The term "perfection" is relative, of course, but in this instance applies to the best use that can be made of the tool or process that has been selected as being the most economical for the amount of production desired.

When a process engineer starts work on a problem, the first task that must be undertaken is the estimating of the cost of its completion and the savings involved. This work requires the close co-operation of the production department, cost accounting department and frequently the product engineering department. The estimated cost is used as a budgetary figure and the estimated savings indicate the relative advantage that will be gained by undertaking the program as laid out by the engineer.

The reviewing and changing of op-

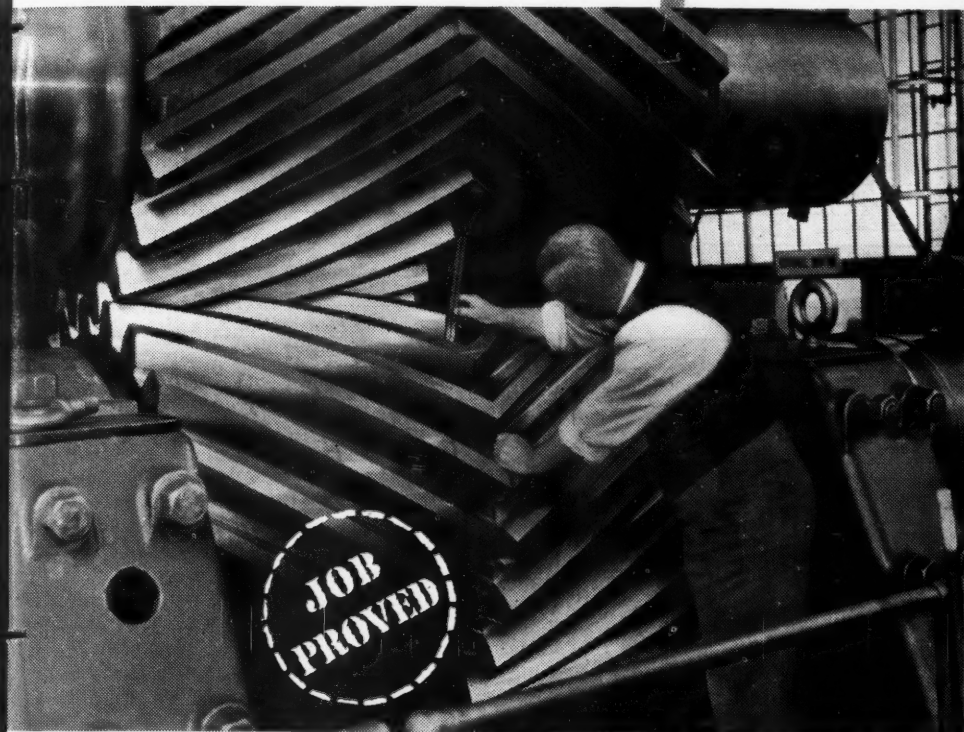
erational sequences is another function of process engineering. In handling such a problem not only should the sequences of operations be listed properly, but they must be studied from the angle of combining and/or improving the methods being employed in the process of manufacture. This requires close co-operation with the design engineering and production groups and often calls for tactful handling in order to co-ordinate the thinking of the two groups.

Frequently, when operation lists have been prepared and checked, it will be found that small changes in design will save many dollars in labor and handling of the product. It should be noted that this operational sequence planning can not be done once and then forgotten. The constant improvement in tools and equipment often makes it advisable to re-study production operation procedures within periods as short as six months. In some cases, operational sequences have become outdated within a time inter-



Interior View of S. K. Wellman plant showing Punch Press and Plating Departments in foreground and Molding and Sintering Department in background.

Production Up 22% on 44-Inch Pinion Gears



SUNICUT . . .

Enables Gear Manufacturer to Increase Feed, Speed, and Tool Life; and to Improve Finish

Since changing to Sunicut, a manufacturer of steel-mill gears has increased production by 22%, improved finish, and added greatly to the life of his gear cutters.

Operation: Cutting 44" herringbone gears.

Machine: Dominion herringbone gear generator.

Materials: Stainless steel, high carbon steel, bronze, other alloys.

Cutting Oil: Sunicut.

This case is just one of thousands in which experienced production men have found that Sun "Job Proved" cutting oils help to increase production and to improve quality as well.

Sunicut is a clear, free-flowing cutting oil, produced by an exclusive Sun process. It has high lubricating value and has excellent heat-dissipating and anti-weld properties. It makes possible heavy cuts at high speed while accuracy and satin-smooth finish are maintained. For full information call your Sun Cutting Oil Engineer or write Department MM-11.

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**INDUSTRIAL
PRODUCTS**

Budget Control

MONTH FEB

APPROPRIATION

\$ 5000 "C"

Fig. 2—Form for Budget Control

[illegible]

Nearly all process engineering departments calculate the results of their work by the principles of some type of cost system. The particular system employed will depend upon the

individual company. The figures obtained from the application of this cost system make it possible for the engineers to study the results of the new processes installed and also provide an opportunity for comparison of the estimated savings with the actual amount saved as shown by the cost system.

In most companies, the figures on all costs of operations are supplied to the process engineering department by the factory cost department. If the company is not organized to supply the information required, the following plan outlines a cost system that can be operated independent of cost accounting.

As previously mentioned, one of the first steps in the work of process engineering is the determination of the estimated cost of a project. When the S. K. Wellman Company of Cleveland, Ohio, manufacturers of powdered metal brake linings and clutch plates, became faced with the problem of solving the estimating, collecting of costs, budgeting, and so on in conjunction with the work of the process engineers, a system was established

32 SPINDLE SPEEDS

Operators are enthusiastic in their praise of this new direct reading speed control. They don't have to refer to index plates or retain lever positions in their minds when making speed changes. Its superiority and convenience encourages operators to use correct speeds for their work. Being direct reading, operators are not fearful of making mistakes.

The entire range of 32 spindle speeds is secured through two opposed vertically operated

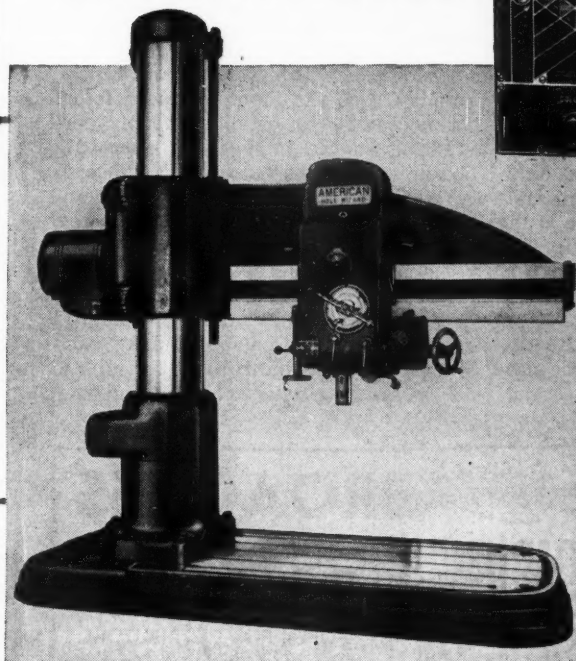
...with only
**2 Control Levers and
1 Back Gear Lever**



levers which are direct reading and one two-position back gear lever used only when changing from the high to the low speed range or vice versa.

This new speed control makes work easier; increases production because of it and the payroll dollar buys more as a consequence.

This and other fine features of the "American" Hole Wizard Radial Drill are thoroughly illustrated and described by Bulletin No. 326.



THE AMERICAN TOOL WORKS CO.

Cincinnati, Ohio, U. S. A.

Lathes and Radial Drills

PLANT ENGINEERING

Project Cost Control Actual

Estimated Cost

50

Project No. 2960

Fig. 3—Form for Project Cost Control (Actual)

MATERIAL			LABOR					WEEKLY TOTAL
DATE	P.O. NUMBER	COST	TOOL ROOM	MAINTEN.			COST	
2/10	61875	5.00		18 75			33.75	
2/11			4 00				4.00	27.75
2/18	79875	2.00					2.00	
2/19				5 25			5.25	
2/22			1 25	3 75			5.00	12.25
			Completed 2/22					40.00

point of its possible need. If the project is accepted for processing, a cost by the proposed method is then estimated and the savings resulting from the completion of the program are calculated. The reverse side of the white copy is used for these calculations.

which operates as follows:

A Tooling and Equipment Order, Fig. 1, was developed to accumulate facts about the suggested project and was also used for the estimated cost analysis. This form is used by all departments submitting problems for study by the process engineering group. The requests are made out in triplicate and all forms are sent to the process engineering department.

Upon receipt of the order in the process engineering department, the project is first studied from the stand-

Along with this Tooling and Equipment Order the plant engineer found it necessary to establish forms pertaining to the budget. An operating budget was set up as a guide concerning the amount of money which management chose to allot to new changes, tools, and so on each month. A suggested tool or method which promised to save a considerable amount of money naturally could not be considered as an expense item, but during each month the expenditures to complete these projects have to be met and they



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Automatic with

initial
and
permanent
accuracy

A NEW LINE OF PRECISION CONTOUR TURNING AND BORING MACHINES

Accurate and Fast — Cam and Air Actuated

Featuring

1. An endless variety of contours or combinations may be generated with a single-point tool. Besides all the regular jobs of straight precision boring and turning, facing and chamfering, it will produce lands, recesses, flanges, steps, counterbores, and radii.

2. A disc type cam for each table gives positive action consistently throughout the day — from the first to the last piece — uninfluenced by temperature changes.

3. Through positive cam action, tool approaches on rapid traverse to within .005 of the work and immediately starts to feed. Tool may cut on feed-in or drawback stroke, or both for rough and finish cuts. On return stroke, tool jumps clear eliminating drag off marks. When moving between intermittent or successive cuts, tool goes into rapid traverse.

4. Uniform temperature, anti-friction bearings and super-precision spindles provide spindle speeds up to 7,500 RPM. Mechanical precision chucking operated by air cylinders. Neither chucking nor unchucking operation affects preload or position of spindle bearings.

5. Only one dimension need be inspected on any one set-up, regardless of the number of diameters produced by any one single-point tool. Cam control and positively repeat from piece to piece.

6. Set-up of machine depends entirely upon nature of job. Work may be rotated in spindles or mounted on table, loaded from the front of the spindle or through the spindle. Spindles may be raised, lowered, or separated. Two spindles are standard, but more may be added. Changing job set-up simply requires replacing two cams setting tool for size and changing chucks.



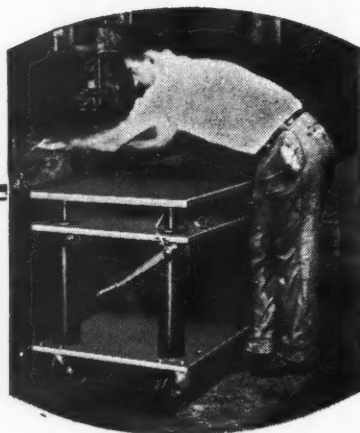
THREE OTHER NEW MACHINES

Latest additions to the New Britain line include: The new, faster, more powerful line of automatic screw machines designed to make the most of carbides on long and short runs, the Model 365, tool rotating, double end chucking machine — and the new line of automatic turret lathes.

NEW BRITAIN

Automatics

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NEW BRITAIN-GRIDLEY MACHINE DIVISION
NEW BRITAIN, CONNECTICUT



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Three table surfaces. **Four point support.** Working area accessible from all sides. Slow lift for heavy loads. Fast lift for light loads. Floor lock for rigid positioning. A practical tool in any plant.

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also have to be kept within the budget figure.

This budget is split into items or Capital Equipment, Tooling or Expense, and Plant Improvement. In some cases even finer divisions might be necessary, but generally it would become too cumbersome to handle unless the system were operated by an experienced cost man. A more elaborate plan was found to be unnecessary for the budget set up by the S. K. Wellman Company process engineering group.

After estimating the cost of the items designated on the Tooling and Equipment Order, the approximate time required to complete the project is determined and noted on the face of the white copy. A letter such as "C" for Capital Equipment, "E" for Expense, and "P" for Plant Improvement is placed on the white copy for easy and quick identification of the budget section to which the cost of the project is to be charged.

A separate Budget Control Form, Fig. 2, is made out for each of the three divisions previously mentioned. It will be noted that each Tooling and Equipment Order is given an identifying number which becomes known as the project number and which is entered in the proper column on the Budget Control Sheet.

On this budget form the estimated cost and date when the project was approved is noted. By deducting the figures in the estimated cost column from those in the budget appropriation column, the balance on hand is calculated and entered in its proper column. The balance figure is the amount of money left for additional projects during that month.

When a project has been completed and all the costs have been accumulated on the Project Cost Control (actual) Form, Fig. 3, the final cost figure is entered in the proper column on the budget control sheet. To obtain



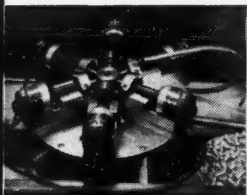
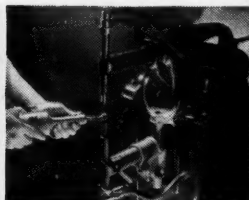
Dumore No. 9 Handgrinder

1/4 HP; 15,500 rpm.; 1/4" chuck capacity



Dumore No. 10 Handgrinder

1/10 HP; 22,000 rpm.; 1/8" chuck capacity.



Dumore No. 8 Handgrinder



1/20 HP; 18,000 rpm.; 1/8" chuck capacity.



Dumore Duplex Handgrinder

1/14 HP; 17,000 rpm.;
1/4", 1/8", and 3/32" chuck capacity.



Wherever you grind or file or burr you can do more with a DUMORE!

Grinding is only the first of many jobs you can do with versatile Dumore Handgrinders. There are dozens of other applications in any shop (a few illustrated above) which are just right for these serviceable tools — polishing, finishing, sanding, burring, scoring, drilling, milling, and many more.

The Dumore Company, Dept. L-33, Racine, Wis.

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Dumore Handgrinder line.

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Address.....

City..... State.....

G-10

Many users have devised special machines with one or more Dumores operating as work-heads. These set-ups prove to be reliable, low-cost production units requiring minimum maintenance, and they save heavy investment in special equipment.

Standardize on Dumore Handgrinders in your shop. There's a size and type for every need. The Duplex is available with an attachment which converts it quickly to a flexible-shaft tool. Ask your distributor to help you select the Dumores you need.

**Tear out this
coupon and
mail today!**

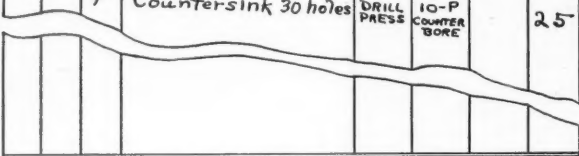
DUMORE
Handgrinders

If you want a GOOD Handgrinder—Buy a Dumore!

INSTRUCTION AND OPERATION SHEET

Sheet 1 of 1

Fig. 4—Instruction and Operation Sheet

Dwg. No. <i>A-7654</i>		Part Name <i>CLUTCH PLATE</i>		Part No. <i>9278</i>	
Cust. Dwg. No.		Customer		B.L.W.A. No.	
Date Issued		Operation <i>FINISHING</i>		Order No.	
Date Revised				Quantity <i>2500 / RUN</i>	
Material					
Dist. Chart in Feet	Oper. Seq.	Description of Operations	Machine	Tools	Standard Prod. per Hour
	1	Turn I. D. 7.005-7.008"	BORING MILL	CARBIDE TIPS	100
	2	Turn O.D. 10.880-10.870	"	"	100
	3	Perforate	PUNCH PRESS	Y-221	58
	4	Countersink 30 holes	DRILL PRESS	10-P COUNTER BORE	25
					
Approved by		Foreman	Supt.	Fact. Mgr.	Lab. Eng.

the future projects of the month.

The Project Cost Control form previously mentioned is used to collect actual costs of labor and material used in completing the project. This information is obtained from job cards, stock requisitions, and purchase order invoices. Weekly expenditure totals

the actual budget figure at any given period during the month after a project had been completed, it is only necessary to calculate the difference between the actual project cost and the estimated cost. This difference may become a plus or minus figure.

If the actual cost is less than the estimated cost, the figure is plus and the difference is then added to the balance column. If the opposite is the case then the balance is reduced. It is, therefore, possible to have a fairly accurate budget figure to work with for

are compared with the estimated costs. The engineer in charge of the project is notified as the accumulated cost approaches the estimated cost. In this manner it is possible to control the costs of all projects and to apply for approval for additional expenditures should such an extra amount be required to complete a program.

Figure 4 shows one type of form used for operational writing and for instructional work. While this form has never actually been used by the S. K. Wellman Company, it was de-

LUERS

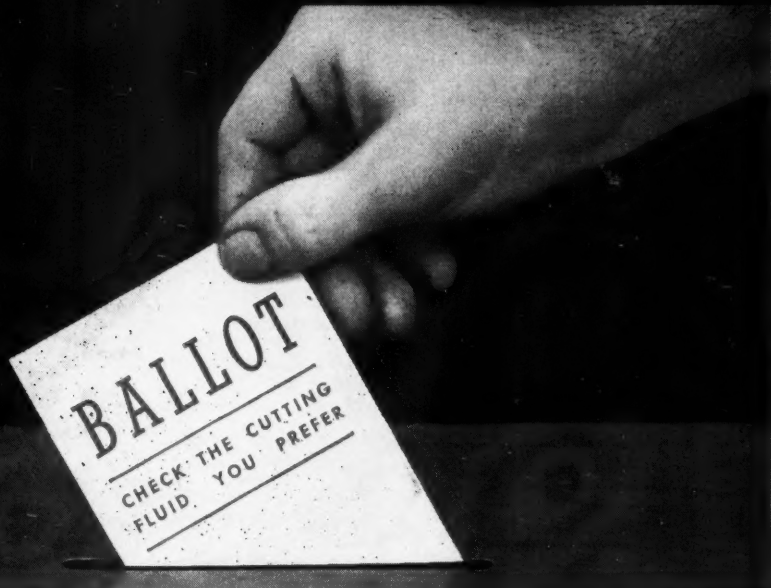
PATENTED CUTTING OFF TOOL HOLDERS PATENTED CUTTING OFF BLADES

ONLY the PATENTED construction of LUERS cutting off BLADES permits normal expansion of bursting chips — MEANS MAXIMUM CUTTING EFFICIENCY.

Manufactured by

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THE RESULT'S "IN THE BAG" *when operators vote!*



Yes, Cimcool wins hands down with metal cutting operators. And no wonder! Just look at the platform it runs on (and lives up to).

- 1 It's clean—doesn't soil hands or clothes.
- 2 Can't smoke—causes no harmful vapors.

- 3 Produces no objectionable odors.
- 4 No slippery film on hands, machine, floor.
- 5 No chromates or other skin irritants.
- 6 Is not subject to rancidity.
- 7 Tools and chips actually stay cool to touch.

OTHER CIMCOOL ADVANTAGES

- Cimcool cools faster—allows faster cutting.
- Uniform work temperature increases accuracy.
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- Covers 85% of all metal working jobs.

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THE
MULTI-PURPOSE
CUTTING FLUID

Trade Mark Reg. by S. Pat. Off.

CIMCOOL DIVISION of THE CINCINNATI MILLING MACHINE CO., CINCINNATI 9, OHIO, U. S. A.

veloped there by the Plant Engineer. The plan in mind was to have the process engineers complete these sheets on all major operations. These forms

engineers to be working on several projects at the same time. The S. K. Wellman Company engineers are no exception: therefore a progress re-

PLANT ENGINEERING DEPARTMENT		
T & E PROGRESS REPORT		
T & E NO.	TITLE	PROGRESS

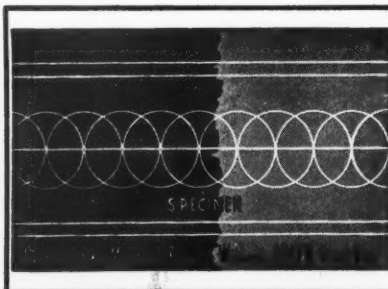
Fig. 5—Weekly T & E Progress Report

were then to be approved by various department heads and placed in all departments for use by the foremen. These operational sheets are not only a help in instructing the new employees on the proper way to produce a product, but they also keep the manufacturing method constant thereby insuring a more uniform product.

It is usually necessary for process

port, shown in Fig. 5, is used to recap the progress on each job. The report is filled out weekly by each engineer and copies are sent to the factory manager, the accounting department, the vice-president in charge of operations and to any others who are interested in the progress of the various projects being handled.

To make the picture of the project



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Stops Losses in Making Dies and Templates

Simply brush on, right at the bench; ready for the layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, and at the same time prevents metal glare. Increases efficiency and accuracy.

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2 NEW LIGHTWEIGHT, COMPACT, POWERFUL **SKIL SANDERS***

for HEAVY DUTY FINISHING on FLAT SURFACES



MODEL "324"

4½ in. belt
with vacuum
dust collector

MODEL "323"

4½ in. belt

*SKIL Sanders are made
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• Name your tough finishing problems on wood, metal, stone or compositions . . . you'll find the answer in these faster-working SKIL Sanders . . . they smoothly sand a strip 4½ in. wide with every easy stroke across the material. And you can't beat them for long life and long satisfaction . . . they're thoroughbred SKIL TOOLS. See your SKILTOOL Distributor today!

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complete it is necessary to develop a final report sheet, Fig. 6, which is used when a project has been completed. In this report is outlined the reason for

Other copies are sent to the engineering office and to the factory manager's office. Such a report notifies all involved that new processes, equipment or

Copies to:	ENGINEERING DEPARTMENT	.
	T&E Project Report	DATE
	Subject:	T&E NO.
<div style="display: flex; justify-content: space-between;"> <div>Prepared by: _____</div> <div>Approved by: _____</div> </div>		

Fig. 6—Final T & E Report

the project and any special information or instructions that should be recorded regarding the work. This information is detailed enough to give a complete picture of the entire project.

A copy of this report is always sent to the department originally issuing the Tooling and Equipment Order.

tooling have been completed and turned over to the manufacturing division for use.

Frequently other types of reports and cost methods are required by management, but the forms and records outlined here have successfully been employed by the S. K. Wellman Com-

Here's a Real Spring Winder!

- No. 1 Capacity 0 thru 3/32" wire, \$1.50
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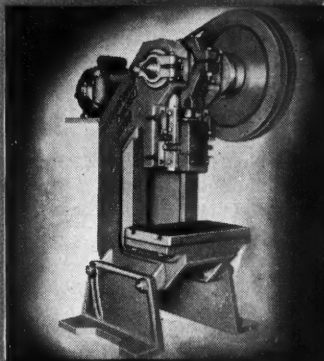
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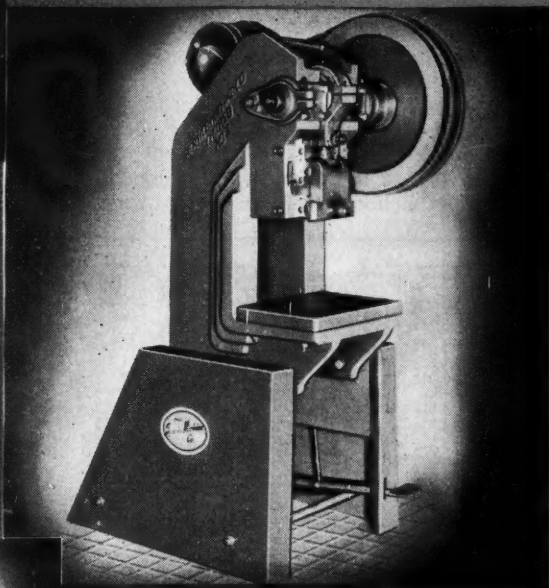
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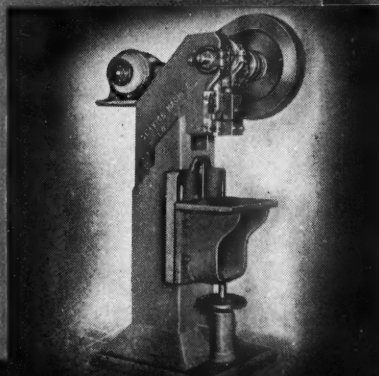


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HORN PRESS

This Press is performing a wider variety of jobs which until recently were not thought of as Press operations.

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The bed can be easily removed for the use of horning dies.



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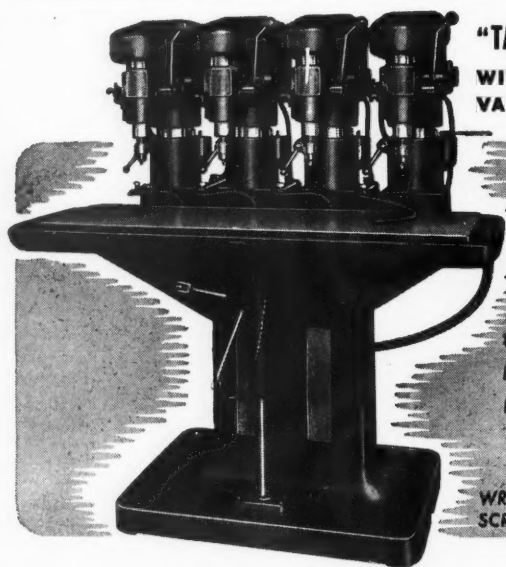
pany. Although of simple design, the forms can, of course, be elaborated and expanded as required to serve any industry or specialized system of manufacture.

Any program of process engineering should be placed under the guidance of a competent engineer who will generally be known as the "production engineer." This man must be widely trained in process development and cost reduction work so that under his direction the process engineering program can be carried on efficiently—always aimed toward the goal of a minimum manufacturing cost and the maximum efficiency of the plant. It is the production engineer's responsibility to establish the necessary paper work to keep management informed as to the work of the process engineering department.

In view of the present world conditions, it behooves all manufacturing

companies to review their production staffs and strengthen them along the lines suggested. The accomplishments made possible through the services of a competent process engineer will make it easier to meet competition and offset to some extent the increased production labor costs due to wage increases. Increased plant efficiency through a study of processes and methods can quickly offset loss in profits to the management resulting from the higher wages. Process engineering is only one of several vital staff departments, but it should play a greater role in future industrial history.

New Britain Precision Contour Boring and Turning Machine, product of the New Britain-Gridley Machine Div., The New Britain Machine Co., New Britain, Conn., is fully illustrated and described in a six-page catalog released by this firm. Copy free upon request.



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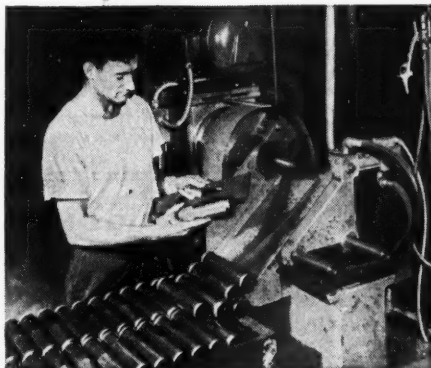


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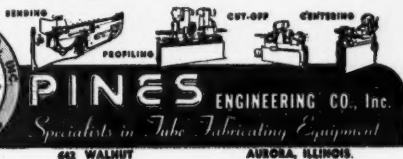


An automotive parts manufacturer uses the Pines Cut-Off machine to cut 575 pieces of tubing per hour with accuracy length to .004" tolerance. The same operation on other equipment produced only 70 pieces per hour. The Pines Cut-Off machine is the simple, automatic way to cut pipe or tubing to accurate lengths rapidly. The average time to complete the automatic machine cycle is 1½ seconds. Production of 1500 pieces per hour is possible, depending on material, diameter, wall thickness, length and type cut desired. When the machine is started by pushbutton control, it continues to cycle and cut until stock is exhausted.

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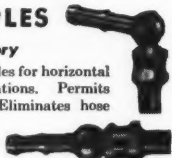


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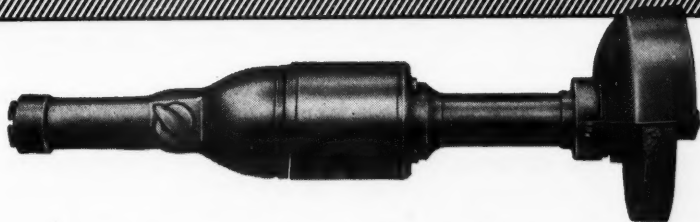


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The Rubber Die Press As a Tool For Forming Aluminum, II

Concluding section — Methods of blanking, shearing,
flanging and forming — Flanging and flanging tools
— Bearer blocks — Drawing

By E. R. YARHAM

England

BLANKING with the rubber die press is not economical for small sizes of work such as, for instance, 2 to 3 inches diameter, since each part requires a marginal allowance of at least 1 inch on duralumin-type alloy

sheet of 20 gauge, which makes the ratio of scrap to blank size unduly high. However, owing to the saving in tool costs, the rubber press may be more economical than the power press

where a large number of various-shaped blanks can be cut simultaneously.

Except in the thinnest gauges, blanks of duralumin-type alloy are difficult to shear in the rubber press without leaving burrs, which must be removed by hand if the blanks are to be used in subsequent

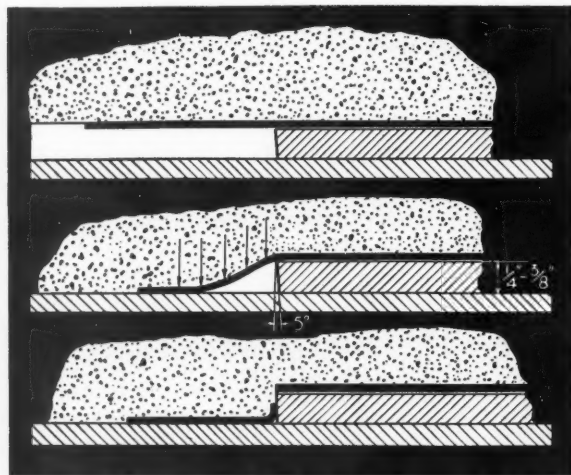
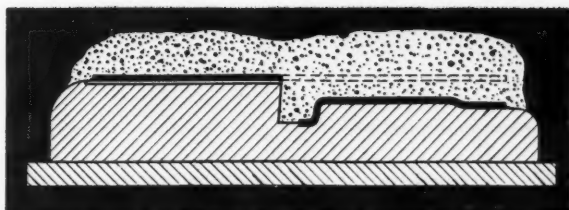


Fig. 4—Illustration of typical shearing tool in action on thin-gauge material.

Fig. 5—Cross-section drawing illustrating action of combined blanking and forming tools.



operations. Shearing by the rubber press is more satisfactory and produces cleaner edges on sheets of pure aluminum or the softer alloys such as D.T.D. 213 A.

A typical shearing tool for use on material of 18 s.w.g. or less is shown in Fig. 4. The base of the tool is of Canadian birch laminations $\frac{1}{4}$ to $\frac{3}{8}$ inch thick, bonded by heat and pressure and faced with stainless steel of 20 s.w.g. The edge of the tool is backed off at an angle of 5 deg. The blank should overlap the edge of the tool by at least 2 inches. If a sheet of rubber $\frac{1}{4}$ inch thick and of the same hardness as that used in the platen is placed

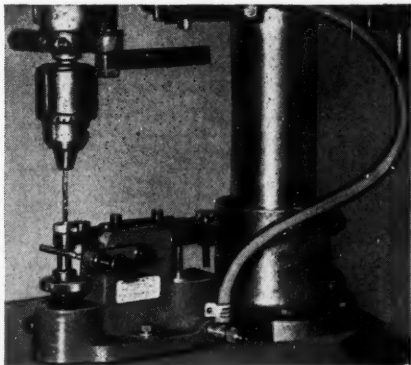
over the part to be sheared, it will concentrate the load and save wear on the main pad.

In practice, much of the production of blanks for rubber presswork is better done by this method than by the use of the high speed router.

Combined Blanking and Forming. Blanking and forming of large components may often be accomplished in a single operation. A simple tool pay-out for this work is shown in Fig 5. The saving in tool costs compared with the expensive tool outlay that would be necessary if the job were done on a

NEW POR-MATIC AIR-OPERATED DRILLING FIXTURE

● This new POR-MATIC air-operated Universal drilling fixture is rigid, sturdy and machined to exact tolerances. It will handle round stock $\frac{1}{16}$ " to 1" and by using a special upper beam or drill bushing carrier $1\frac{1}{2}$ " can be received for cross drilling. This fixture can be mounted on any of the regular bench type or floor type drill presses in a matter of minutes. Depending on type of material and diameter of hole size, it will increase production from 33% to 200%.



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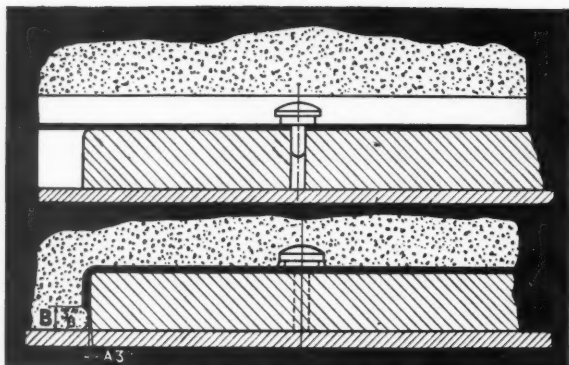


Fig. 6 — Method of forming simple flanges showing (above) before and (below) after forming.

power press is obvious. Typical components such as airplane ribs having a number of lightening holes can be produced with two simple tools; (a) a blanking template of 10 to 12 s.w.g., made of mild steel to the developed shape of the component, and (b) a zinc-alloy casting for the second stage of blanking and flanging.

inum-coated duralumin-type sheet to D.T.D. 390 although the angle will vary slightly according to the pressure applied and the shape of the flanges.

To ensure correct forming, a gap must be left between the platen and the bottom of the formed flange; if this gap is omitted the flange will be slightly convex. The minimum allow-

Flanging. A simple flanging operation is shown in Fig. 6. The necessary compensation for "spring - back" is provided by the angle A, 3 degrees being an average value for alum-

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BUTTERFLY FILING and SAWING MACHINE

(Die Making Machine)

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They are built with table sizes from 12" to 36" wide by 36" to 192" long.

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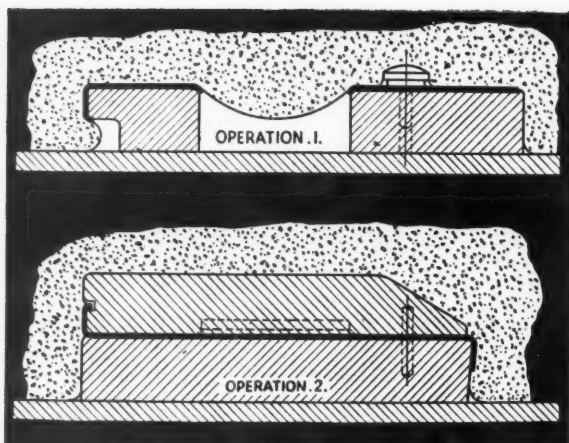


Fig. 7—Illustration of method of forming lipped and reversed flanges.

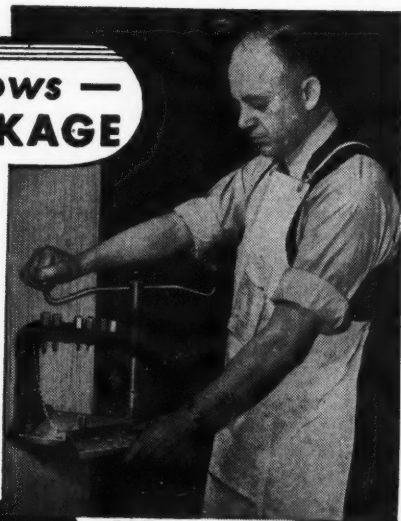
Flanged holes may be regarded as normal flanges. Ordinary fluting cannot be formed to a greater depth than $\frac{1}{2}$ inch or shearing will occur. Since the fluting operation stresses the material and generally reduces the gauge, it should not be consid-

ered as the press substitute for drawn sections. It is better practice to raise sections of the material to a height of from $\frac{1}{4}$ inch to $\frac{3}{8}$ inch.

Lipped and Reversed Flanges. A

As Every Machinist Knows — IT PAYS to **BREAKAGE** REDUCE TAP

Does the job in a fraction of the time required for hand tapping. Because the work is dependably straight and square, tap breakage is practically eliminated — and gone are the wasted hours of trying to pry broken taps out of dies. Equipped with seven Adaptors, ranging from 8-32 to $\frac{1}{2}$ ", it takes care of 95% of all tapping requirements. (Taps not furnished). \$52.50 F.O.B. Minneapolis. Ask your mill supply house, or write Dahlstrom Mfg. Co., 418 South 6th St., Minneapolis 15, Minn.



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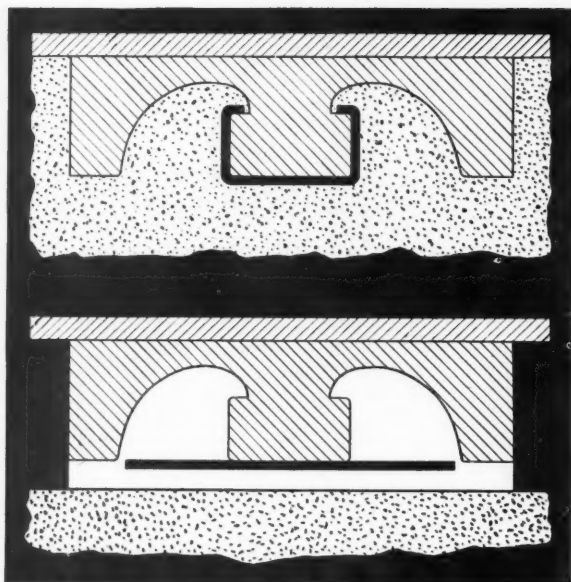


Fig. 8—Drawing illustrating design of tool for forming double flanges.

method of forming lipped and reversed flanges is illustrated in the drawing Fig. 7. Since such parts are frequently long in proportion to their width, often one of the flanges will have a large convex radius, which causes the part to buckle and in some cases twist along its main axis. While this result is not serious, the possibility should be borne in mind. The drawing Fig. 8 shows the design of the tools for forming straightforward double flanges.

Shrink Flanges. A method of form-

ing a flange around a convex radius, providing what is known as a shrink flange, is illustrated in Fig. 9. To form a flange of this type, the free edges of the sheet must, in theory, be compressed. For practical purposes it can be assumed that no compression takes place, but buckles will form in the sheet and may be incorporated in the design process known as "controlled wrinkling" or "crimping."

Flanges can usually be located and formed in one operation, although with material of 15 s.w.g. and thicker a locating process is first necessary with the flanges at an angle of 30 deg., as shown in Fig. 9-A. Another method consists in providing "cut-outs" to relieve the compression. A section of the blank with "cut-outs" is shown in Fig. 9-C, and the part after forming is shown in Fig. 9-D.

Standard Flanging Accessories. Standard flanging tools are shown in

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PNEUMATIC VISE MODEL J-5

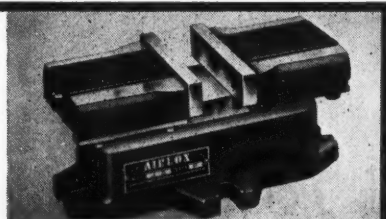
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Jaw force: 25 times air-line pressure.

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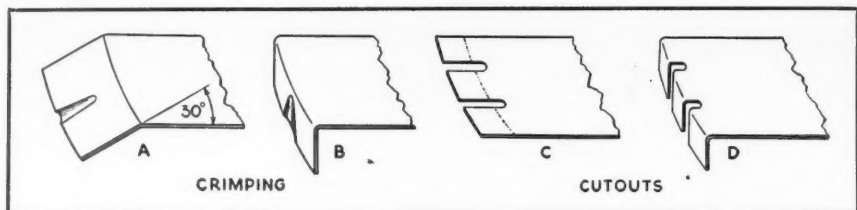


Fig. 9—Illustration of methods of forming flanges around convex radii.

Fig. 10. The blanks are positioned on formers with loose locating pins of, usually, $\frac{3}{16}$ or $\frac{1}{4}$ inch diameter. The heads of the pins are recessed so that the pins may be withdrawn with a forked lever. Soft forming tools normally are fitted with steel locating bushings, since the constant withdrawal of the pins causes excessive wear on the composition tool.

Narrow Flanges and Joggles. The drawing Fig. 11-A illustrates the use of a roller in conjunction with the

forming tools to produce very narrow, straight flanges. As shown in the drawing at A, the blank is positioned with the roller on top. A pressure pad that is higher than the roller is placed on the blank to ensure that the pressure load reaches the blank first and holds it in position. The roller is then pressed downward into the recess provided, forming the flange as it descends. Narrow flanges having large radii require greater pressure concentrations than do flanges with wide

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Spindle Speed 600-5000 RPM

The Gilman Instrument Lathe is designed to operate safely at high speeds. Its well-balanced spindle, which is mounted in class 5 ball bearings, will permit small diameter turning with high finish results. An ideal Lathe for the development department and model shop. Also available with production accessories, incorporating the double-tool post cross slide and six-station, automatic indexing turret. Chrome satin finished dials, ground lead screws and precision built throughout. A beautiful machine tool you'll be proud to own and use.

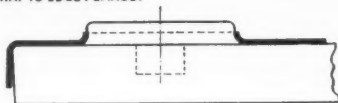
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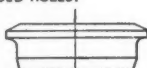
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STANDARD BUTTON FOR FORMING
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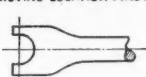


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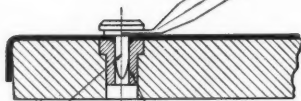


Fig. 10 — Drawing of
standard tools for
forming flanges on
blanks.

flutes and small radii.

Closely allied to the forming of convex flanges is the forming of joggles, which consist of offsets in the bend line of a component as shown in Fig. 11-B and involve reducing the width of the web locally without changing

any other dimensions. Though normally formed by the use of mechanical dies, several methods for producing them by the rubber press method have

been developed. One of these methods can be applied to form both joggles and very narrow straight flanges, using a specially-shaped roller, shown in Fig. 11-C, as described above.

When a joggle or other indentation is necessary in a component that is

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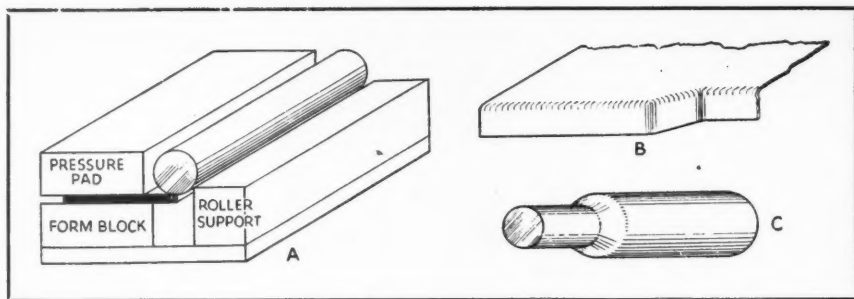


Fig. 11—Drawing illustrating use of roller to form straight flanges and "joggles."

being formed in the fully heat-treated condition, it is often desirable to place an ironing plate on top of the blank with the desired shape machined in it, thus concentrating the pressure at the required point.

The use of undercut die blocks with an appropriate bearer block, as shown in Fig. 12, gives good results when short flanges are required on fully

heat-treated material or on annealed sheet of heavy gauge. The depth of undercut should not exceed $\frac{1}{16}$ inch, otherwise the pressure concentration upon the radius will cause the horizontal top flute to curve upward.

Use of Bearer Blocks. Forming involves compressive strains and consequent wrinkling in many components, but the development of the bearer

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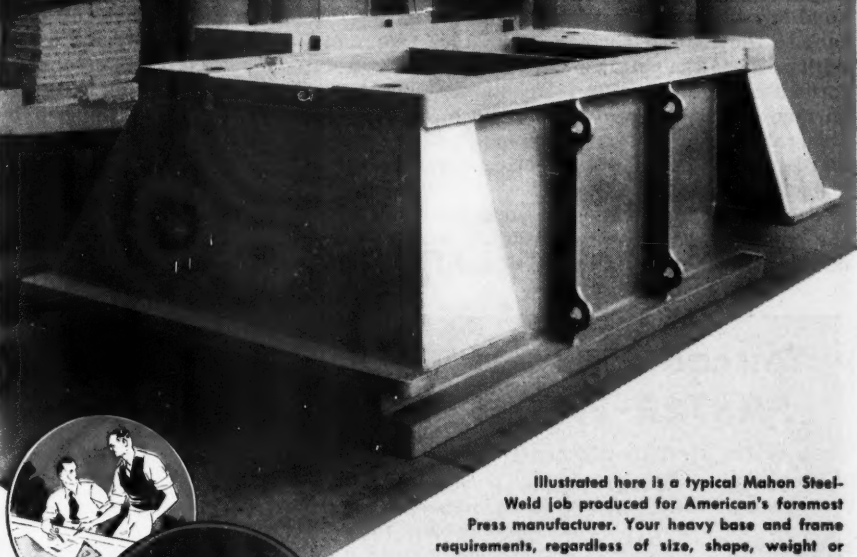
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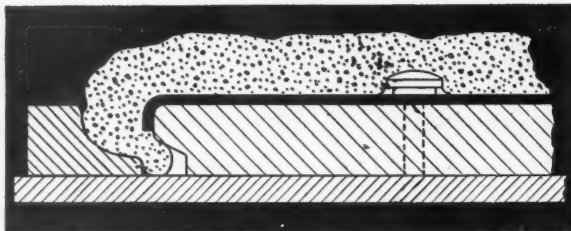


Fig. 12—Illustration of use of undercut dies to form narrow flanges having large radii. The bearer block is required to concentrate the pressure.

block technique has increased the range of permissible strains considerably. The equipment consists of an auxiliary block which is placed adjacent to the regular form block in the region where the shrink flange is to be formed, as shown in Fig. 13. The inner surface of the bearer angle may be straight, as illustrated, or curved upwards, as in Fig. 14, the effectiveness being approximately equal.

Table I gives recommendations for the construction of such blocks. It is not claimed that wrinkles can be elim-

inated by the minimum contour radii recommended, but they will prevent the occurrence of very tight wrinkles which cannot be removed by hand.

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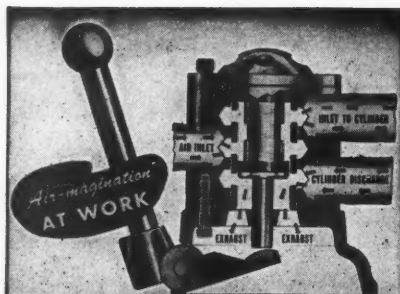
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is then placed upon the form block and pressure applied in the normal manner, after which the Cerrobend wedges are placed in position and pressure is again applied. This procedure may be repeated a number of times until a perfect part has been produced.

The use of a convex bearer block makes it possible to overcome difficulties in convex flanging by drawing a deeper flange than is required, the excess of flange absorbing the wrinkles. The excess is subsequently trimmed off.

Other Flanging Methods. Another method of forming flanges is illustrated in Fig. 15. In this instance a blank

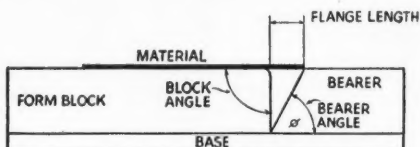


Fig. 13 — Drawing illustrating bearer block technique for control of wrinkles.

locating block which rests on springs enables the blanks to be correctly located. A draw ring is placed on the top of the blank locating block and the part is formed, the springs being compressed as the draw ring and locating ring are forced downward. When the load on the rubber pad is released, the locating block acts as an ejector and forces the part off the tool.

The drawing Fig. 16 shows the technique employed to form flanges around concave and convex radii in cases where wrinkles are not permissible. The two graphs show the respective flanges which may be formed without wrinkling or splitting in the free condition for any given radius.

The drawing Fig. 17 illustrates the use of a circular steel frame located on the edge of the blank to form and flange circular blanks of comparative-



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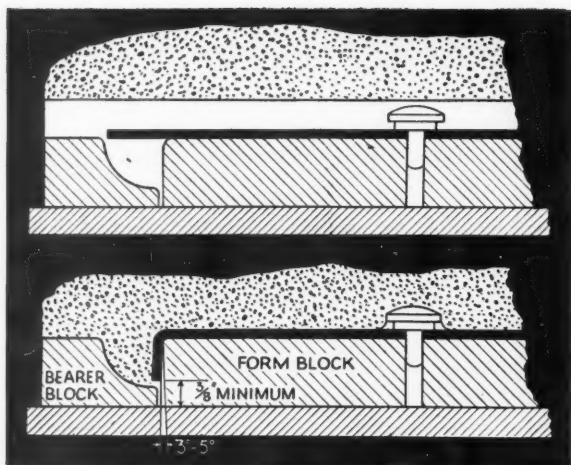


Fig. 14—Drawing of beaver block designed with curved inner edge. Drawing shows spring-back allowance on form block.

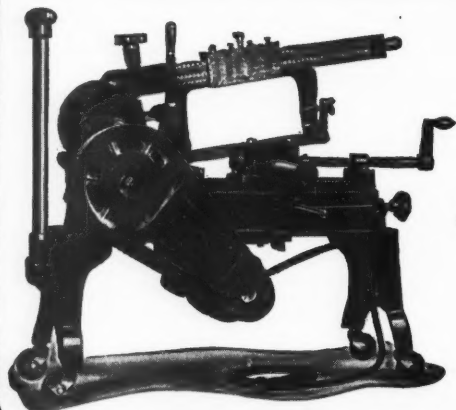
members may also be used to ensure a more positive pressure than would be possible when using the rubber pad alone. The hinged upper die is built up around the normal form so that, as pressure is applied, the side hinges close over the lower form die. Using this

ly small diameter. Careful positioning of the former is necessary if it is not to be forced down unevenly and bent.

A forming die designed to incorporate a top plate with hinged side

method, sharp corners and very small flanges can be formed without wastage of material, obviating the necessity for excess metal to provide adequate leverage and the extra oper-

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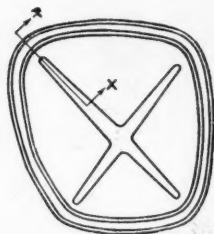
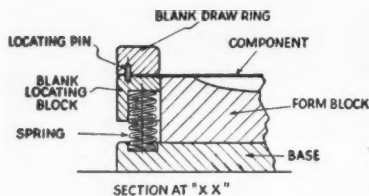


Fig. 15 — Drawing illustrating method of flanging, using spring block and draw ring.

ation of trimming this metal.

Drawing. Duralumin - type alloys can be drawn successfully provided the shape to be drawn is such that the restricted technique permissible with the use of the rubber die press can be applied. The method is as follows:

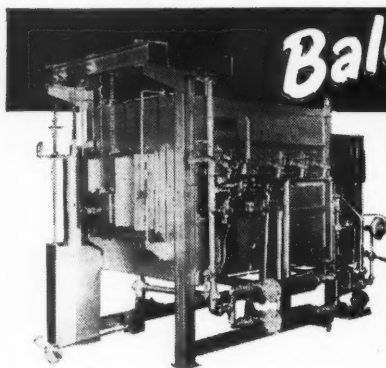
The drawing die is located on the platen and the blank is interposed between it and the rubber pad. A piece of rubber sheet about one inch thick is used as a pressure pad to control the flow of the metal during deformation. The rubber piece should be large

shape of the part to be drawn.

Pieces of rubber of 60 to 70 Shore hardness are placed over the part to be formed, then pressure is applied, causing the loose rubber to force the metal into the die. When the pressure is released, additional loose pieces of rubber are inserted so that the draw can be extended during the second stage. The sheet is then annealed and the process is repeated.

During the second draw the sheet is drawn about one-third the amount extended during the first draw, and

enough to cover the blank and should be cut away to the



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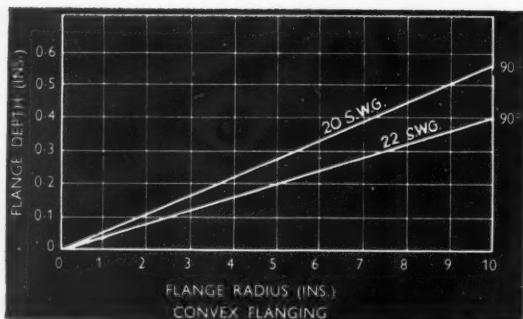


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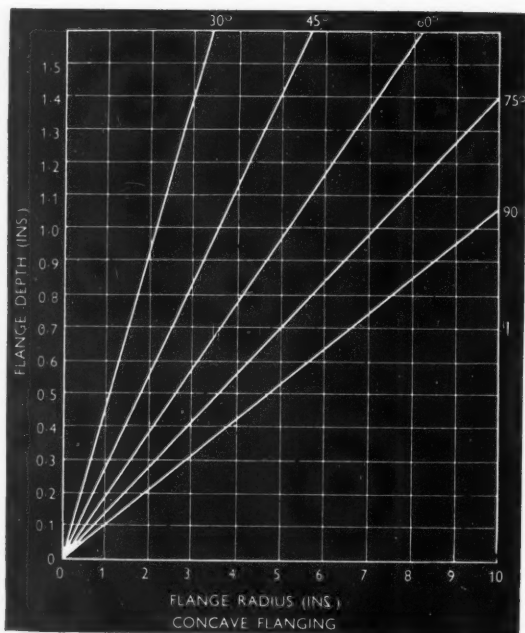
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Fig. 16—Graphs showing permissible depths for convex and concave flanges. Angles shown are 180 deg. minus the part angle.

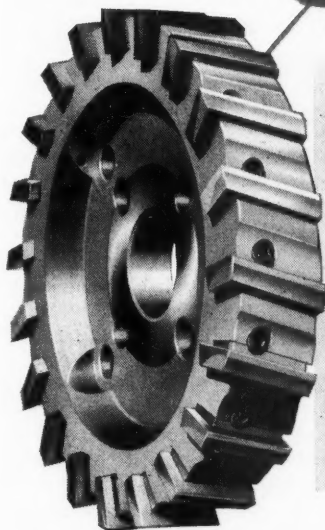
each successive draw becomes less until the sheet touches the bottom of the die. Provided the alloy is well annealed, a 7¼-inch draw can be completed in five stages; 4 inches in the

first stage, 1½ inch in the second, 1 inch in the third, ¾ inch in the fourth, and ½ inch in the fifth.

Female dies should be provided with air vent holes, otherwise considerable

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8108X	8"	14	2- $\frac{1}{2}$ "	45.00
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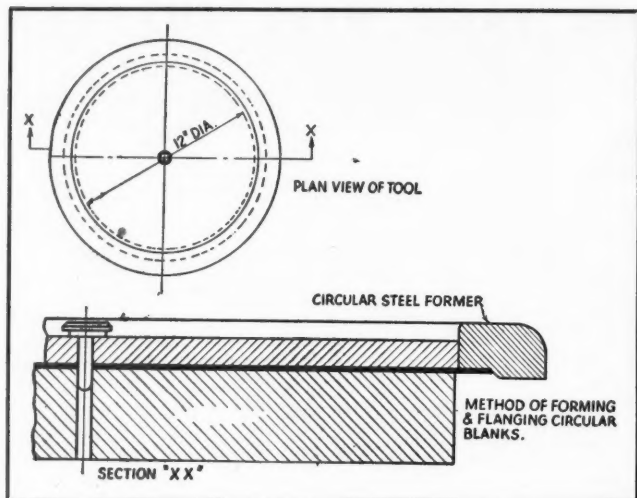


Fig. 17—Drawing illustrating use of metal ring in forming and flanging small circular blanks.

by forming a bend around the edge of the flange.

A trial piece should be drawn to determine the size of the blank and the width of the flange, also the extent of each draw. If this procedure is followed,

pressure may be built up between the material and the die, thus preventing the pressing from reaching the bottom of the die. In the case of heat-treated material, the component should be solution heat treated before the final draw.

The amount of pressure to be exerted depends upon the nature and thickness of the material. Aluminum-coated duralumin-type sheet of 18 s.w.g. can be drawn with pressures of 500 lb. to the square inch. If the draw is relatively deep, it may be necessary to apply additional clamping pressure to stabilize the flange. This may be done

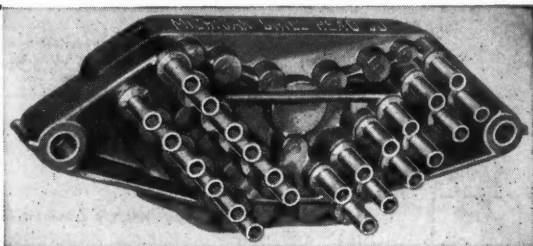
ed, a number of components can then be processed and carried to successive stages together, the depth of each draw being indicated on a gauge. Die blocks for drawing are made from seasoned hardwood 1½ inch thick; glued and screwed together to form the required total thickness.

Springback. One of the difficulties experienced in the forming of aluminum alloys—especially the duralumin-type alloys—by the rubber die press is the “springback” of the metal; i. e., when withdrawn from the press the metal attempts to regain its former shape and thus “springs back”

Pictured: a 24-Spindle Heavy-Duty Drill Head.

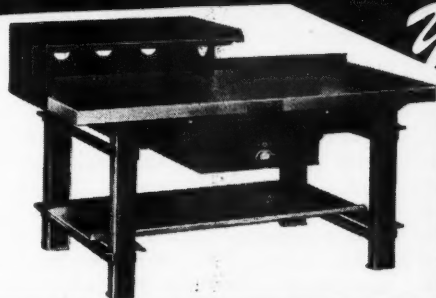
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several degrees from the point to which it was drawn. Table II gives the average form block angles that should be used to counteract springback in parts formed from aluminum-coated duralumin-type sheet to D.T.D. 390 in the naturally-aged condition.* The amount of springback is very small—often negligible—in the case of pure aluminum and the low-strength alloys.

The press load was calculated to produce an average pressure on the sheet of approximately 1,300 lb. per square inch. The majority of the parts were formed with rubber of Shore hardness of 60 to 65. It was found that the results were influenced by a number of variables such as the amount of unit pressure exerted on the part by the rubber die or proximity of adjacent objects or form blocks, while the hardness of the rubber and the length of the form blocks exerted a considerable amount of influence on forming conditions.

It was noted that although the pressure on the block might exceed a certain critical value, the angle remained constant beyond this point. Thus it is evident that the springback angle may be stabilized considerably by exerting the maximum pressure practicable for the equipment.

The unit pressure exerted on the form block may be increased materially by (1) increasing the applied press load, (2) judicious use of "displacement blocks" consisting of metal blocks designed with a base of 5 x 12 x 3½ inches and with well-rounded corners, as shown in Fig. 18, (3) increasing the height of the form block. But care must be exercised when locating the number of displacement blocks on any one table loading. If an excessive number is used, the principal load will be taken by the displacement blocks and the form itself will be subjected to decreased rather than increased pressure.

A black and white illustration of a woman wearing a cap and a light-colored blouse, operating a large industrial punch press. She is positioned on the right side of the machine, looking towards the left. The machine has a large vertical frame with a series of vertical rods or strands that act as a safety guard. The woman's hands are near the base of the machine, where a piece of material is being processed. The background is dark, making the machine and the woman stand out.

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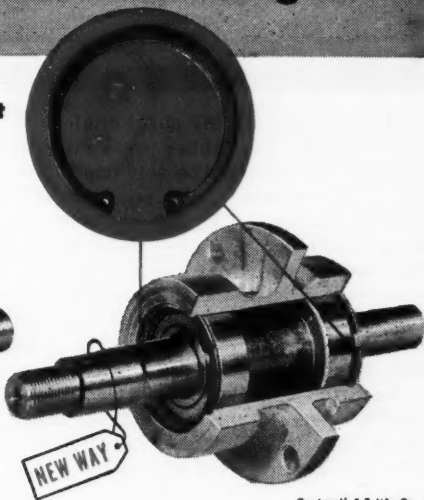
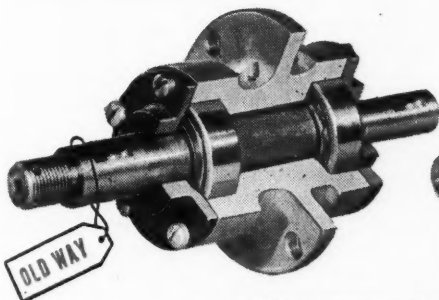
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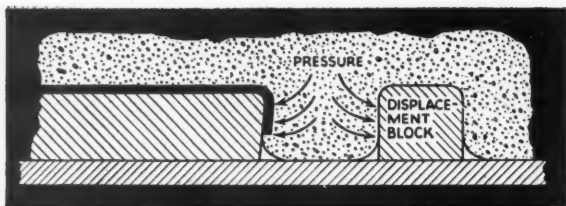


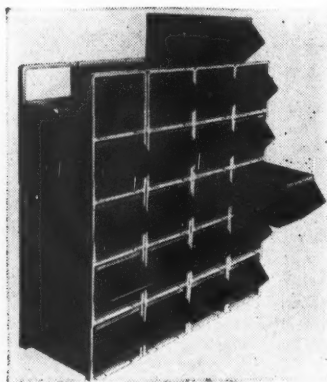
Fig. 18 — Drawing illustrating method of increasing pressure on the form block by use of auxiliary displacement blocks.

High-strength alloy sheet that is to be formed by the rubber press method is normally used in the soft condition. The heat treatable alloys, such as sheet to B. S. 5L3 or D.T.D. 390, are solution heat treated by normal procedure before being used. Age hardening, however, sets in within an hour of quenching and reduces the ductility of the material, thus making forming difficult, if not impossible.

Accordingly, when sheets cannot be used immediately after solution treatment they are chilled in paraffin and placed in refrigerated storage the tem-

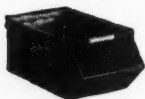
perature of which is —8 deg. C. to —10 deg. C. At this temperature material can be stored in the solution heat treated condition for about 48 hours and still be safely worked within a period of two hours upon release. When removed from cold storage, the materials are held close to the loading table in refrigerated trucks in which the temperature is —8 deg. Centigrade.

Inasmuch as the press will not correct distortion caused by heat treatment, before forming, heat treated material should be flattened in a machine of the roller-leveller type.



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STACKRACKS**

REDUCE HANDLING of Tools, Parts and Materials



STACKBINS are individual hopper-fronted stacking bins, designed for storage, transportation and assembly of tools, parts and materials.

STACKRACKS are individual units which lock together to form racks of any size, shape or capacity. Stackbins slide like drawers in Stackracks.

Because Stackbins are portable containers—not fixtures—tools, parts and materials can be carried to departments, from machine to machine, or held in stockrooms without being transferred from one container to another. Stored in Stackracks, any Stackbin is instantly accessible when its contents are needed—without disturbing any other bin.

*Manufactured and sold in Canada exclusively
by Walter H. Wickware, Ottawa*

Write Stackbin Corp., 1083 Main St., Pawtucket, R. I.

STACKBIN

"Stacked and



SYSTEM

Still Accessible"

L-W

SWIVEL BASE MILLING MACHINE VISES

MASTER \$38.00

Jaws: 6½" wide, 2" deep.
Opens 4" with jaws, 5¼" without.
Wt. complete with crank, boxed, 85 lb.

★
JUNIOR \$28.35

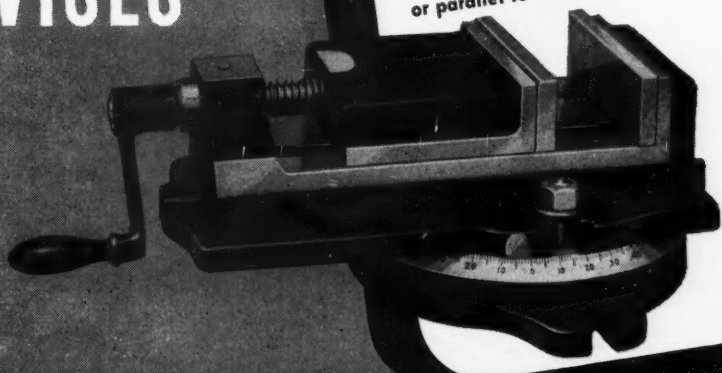
Jaws: 4½" wide, 1¾" deep.
Opens 3" with jaws, 3½" without.
Wt. complete with crank, boxed, 35 lb.

★
STEEL JAWS
Suited to drill press and shaper work.

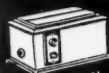
GRADUATED BASE
Can be used plain or swivel.

LARGE ACME STEEL SCREW
Contributes sturdiness and durability.

FOUR BOLT AND KEY SLOTS
are provided for rigidly attaching to machine table so that work holding surfaces are at true right angles or parallel to table.



Send for complete catalog giving prices and specifications on these quality, low-cost L-W Products



DEMAGNETIZERS



MAGNETIC CHUCKS



DIVIDING HEADS



RECTIFIERS



DEMAGNETIZING SWITCHES



LATHE CHUCKS



UNIVERSAL CHUCKS



POWER HACK SAWS



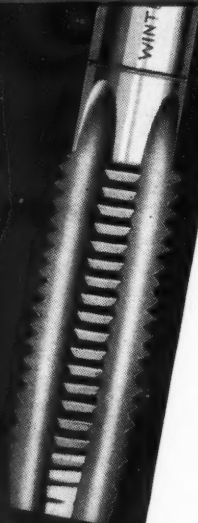
MILLING MACHINE VISES

L-W CHUCK COMPANY

28 SO. ST. CLAIR ST.
TOLEDO 4, OHIO

WINTER *Commercial Ground* TAPS

Leadership
BUILDS ON
Craftsmanship



WINTER Commercial Ground Thread Taps are the ideal choice for accuracy and economy. They are form ground after hardening by an exclusive WINTER process, and will work freely—even on tough materials. For faster, easier tapping to reasonably close limits, with less strain on tool and work, specify WINTER Commercial Ground Thread Taps.

Craftsmanship of the highest order always has been employed in the manufacture of WINTER Taps.



*Always at
Your Service*



YOUR LOCAL DISTRIBUTOR carries a complete stock of WINTER Taps on his shelves—as close to your tapping problems as the telephone on your desk.

Winter Brothers COMPANY

ROCHESTER, MICH. and WRENTHAM, MASS. • Distributors in Principal Cities
A Division of the National Twist Drill and Tool Company • Branch Stores: San Francisco, Chicago, Detroit



NATIONAL *Inverted* SPOTFACERS

NATIONAL Spline-Drive Inverted Spotfacers combine ruggedness, positive driving and accurate alignment with long life and easy assembly. The drive is accomplished through splines that are part of the pilot, bearing against slots in the cutter. The cutter is retained by solid shoulders on the pilot. Removal is simple; just turn cutter backwards on the pilot and slide off. Spline-Drive Inverted Spotfacers are part of NATIONAL'S complete line of Rotary Metal Cutting Tools.

Craftsmanship
INSURES
Quality



*Call Your
Distributor*

LEADING DISTRIBUTORS EVERYWHERE offer complete stocks of NATIONAL Cutting Tools. Call them for cutting tools or any other staple industrial product.

The skill and facilities to make NATIONAL Tools the best you can buy are supplied at NATIONAL'S great new plant in Rochester, Michigan.



NATIONAL *TWIST DRILL AND TOOL COMPANY*

ROCHESTER, MICHIGAN, U. S. A. Tap and Die Division — Winter Bros. Co.
Distributors in Principal Cities • Factory Branches: New York • Chicago • Detroit • Cleveland • San Francisco





Report On The Machine Tool Show

CIVILIZATION has existed on this planet for some ten thousand years, and many of the nations of the Earth are thousands of years old. The United States is less than 175 years old, yet in those 175 years this country has come to be known throughout the world as the land of genius, production, and high living standards.

The wealth of a nation isn't measured by the amount of gold its citizens are able to dig out of the ground; wealth is created when means are discovered or developed for producing better living accessories, for producing them in such quantities and at such low costs that they can be made available to the public at large.

For the past several generations America has been known throughout the world as the land where all have equal rights, where anyone can own his own home and business, where one can enjoy conveniences that in the old countries have been available only to the nobility or the wealthy, and as the country where the returns for labor are many times the wages and salaries that are paid in the old countries. America is generally regarded as a wealthy nation—with that wealth available to anyone who will put forth the necessary effort.

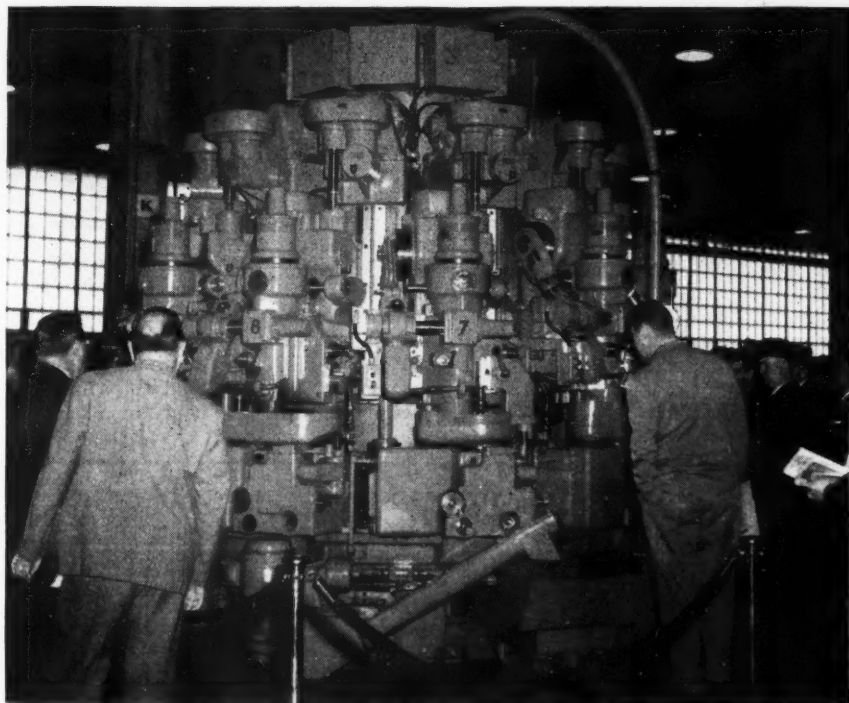
Today America is not merely looked upon as the "wealthy relation"; today a large part of the world is looking to

America to supply it with money and with the necessities of life. It is true that in a measure this advantageous position is due to the fact that America has thus far been spared the ravages of war, but to a much larger extent this position is due to the same reason that America has for generations led the world in wealth and living standards—a peculiar American ability to devise ways and means for producing the necessities and luxuries of life on a mass production basis.

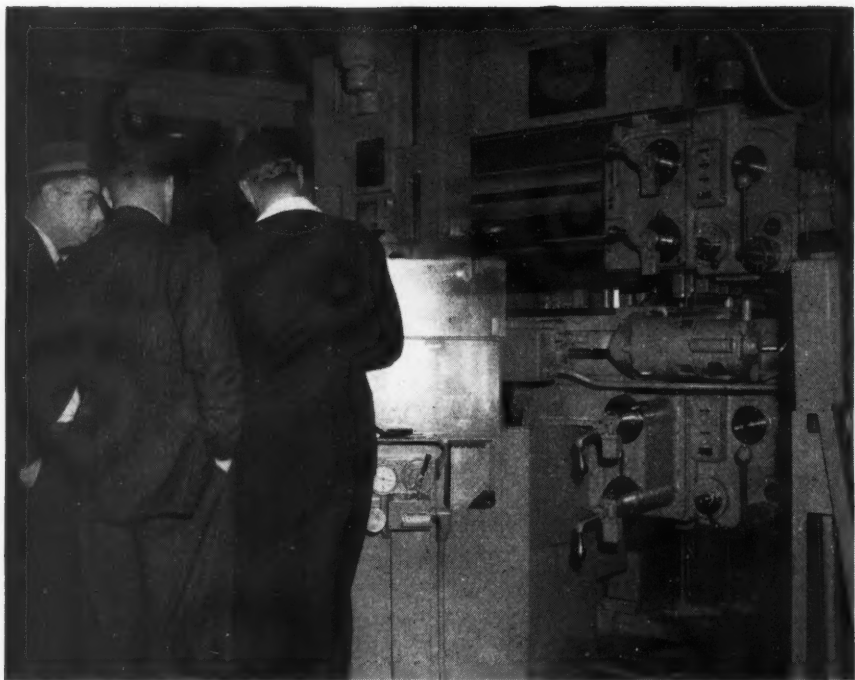
Although templates and jigs had been used to a limited extent prior to the turn of the century, the infant automobile industry supplied the first real opportunities for the development of production tooling. As the industry

entered upon its period of growth and expansion the science of tool engineering as we know it today was born. Designers and draftsmen were detached from the engineering department and assigned to the task of searching out the shop operations upon which jigs, fixtures and special tools could be used to advantage, and eventually separate "tool engineering" departments were set up devoted exclusively to the task of designing these tools.

Starting out as a stepchild, within a few years the tool engineer was depended upon for ways and means to increase production on the individual operations, to devise power conveyors and other material-handling methods whereby hand labor could be eliminat-



The visitors are trying to discover how one machine can cut ten gears of different shapes and sizes simultaneously. This rotary gear shaper is the answer to constantly-rising labor costs.



Equipped with a "Man-Au-Trol," this boring mill will finish a workpiece completely to blueprint specifications.

ed and parts could be moved without delay, and to devise ways and means for producing at rates of speed which would result in lowered production costs.

Taking the Olds automobile as an

example; in 1904 the Olds "6-C" or "B" curve-dash "runabout," designed with a steering handle and with the two-cylinder motor under the seat, sold for \$650. In 1906 the "Express" four-cylinder car sold for \$3,000. In

PRODUCERS OF SCREW MACHINE PRODUCTS TO SPECIFICATIONS

We have:

ONE, FOUR and SIX spindle automatics maximum capacity 2½" round. Hand Screw Machines and Universal Turret Lathes maximum capacity 3" round. Castings and Forgings machined maximum 10" diameter, 8" length, 15 pound weight. Secondary operation equipment for milling, drilling, tapping and assembling. Fabricators of aluminum, brass, steel and their alloys.

WRITE FOR ESTIMATE

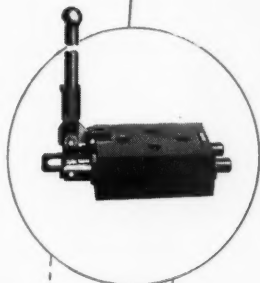
SCREW MACHINE SPECIALTY CO.,

• 5700 Butler St., Pittsburgh 1, Pa.

HUNT

Quick-As-Wink Valves

**give safe, positive control in
Crown Cork and Seal Strip Mill**

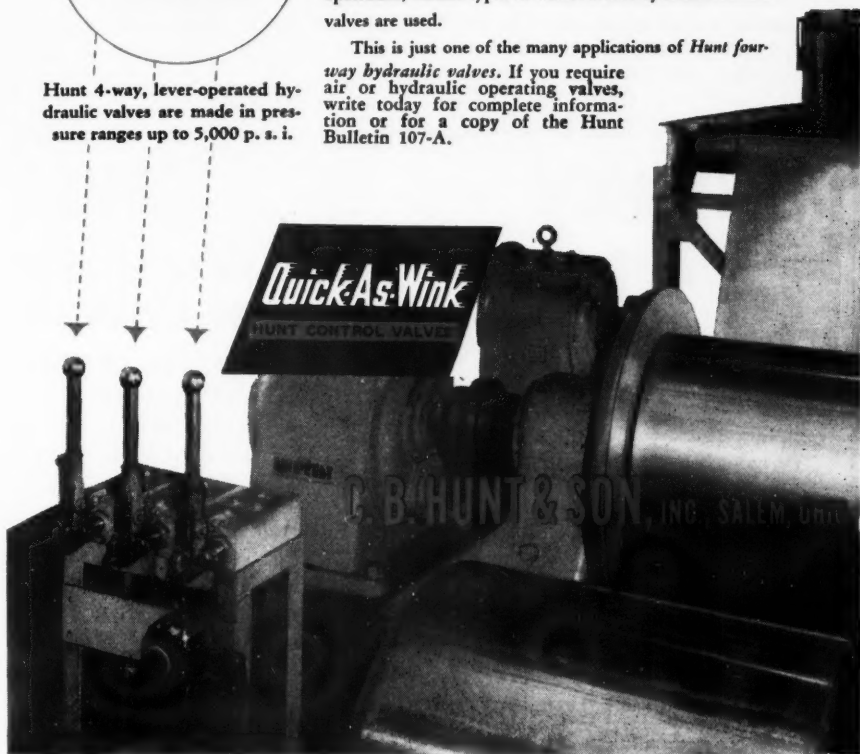


Hunt 4-way, lever-operated hydraulic valves are made in pressure ranges up to 5,000 p. s. i.

● This illustration shows three 4-way, neutral position valves handling 1000 pounds pressure and used for controlling coil holders at entry end of continuous strip annealing furnace. The two end valves operate the reel heads on the clamping mechanism while the center valve operates the coil elevator.

The Crown Cork and Seal Company are the world's largest producers of bottle caps and in their many diversified manufacturing operations, various types of Hunt air and hydraulic control valves are used.

This is just one of the many applications of Hunt four-way hydraulic valves. If you require air or hydraulic operating valves, write today for complete information or for a copy of the Hunt Bulletin 107-A.





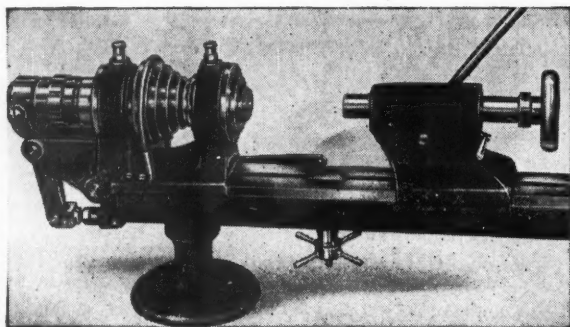
The automatic screw machines interested everyone—even those who didn't understand them.

er speeds — with either six or eight-cylinder motor has sold for one-third of that price. The appearance and performance of the former car could not begin to compare with that of the more modern type.

more recent years an Olds of incomparably better design—much finer mechanically, better riding, easier handling, safer, capable of much high-

Yet the price, instead of being increased as new conveniences were added and the design was improved, has been decreased. All of this can be

DERBYSHIRE *Fine Precision Instrument* LATHES



FOR INSTRUMENT AND WATCHMAKING

- THREAD CUTTING
- CENTERING
- TURNING
- GRINDING
- DRILLING
- REAMING
- FORMING
- MILLING

• Illustrated • CAPACITY .315" • BED 12" • SWING 3.94"
MAGNUS BALL-BEARING LATHE • COMBINATION TAILSTOCK
SPRING-BIND COLLET CLOSER ATTACHMENT.

F. W. DERBYSHIRE, INC., WALTHAM 54, MASSACHUSETTS

Think of *haskins*
FIRST . . . because they
LAST!



haskins
 FLEXIBLE SHAFT EQUIPMENT



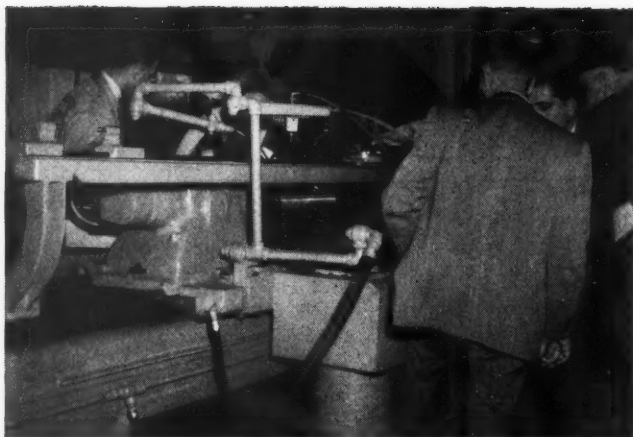
Diemakers, moldmakers, fabricators—all become better, speedier craftsmen when they use Haskins Flexible Shaft Machines for grinding, buffing, polishing, sanding, rotary filing, wire brushing.

Yes, Haskins portable tools are *first* in the shop—and *first* in the front office where cost records prove their negligible maintenance cost, their year-after-year usefulness under tough, high-production conditions.

If flexible shaft machines could help solve your production, think of Haskins *first!* Send for details. R. G. Haskins Company, 2647 W. Harrison Street, Chicago 12, Illinois.



HS-4, 1/2 h.p. multi-speed, countershaft unit, 1500 to 7800 R. P. M., mounted bench height on caster base, 360° swivel. One of many models.



With an air-operated tracer following the contour of a pattern, this lathe will automatically reproduce the contour of the pattern within limits of accuracy of "tenths."

credited to the abilities of the Yankee engineer.

In the past few years a new problem has arisen. Due to the shortages caused by the recent war and to the de-

cessary to normal existence have risen to abnormal heights. In some cases the labor costs have completely wiped out the returns on invested money, and plants have closed permanently. In

mands of unionized labor for a much larger share of the returns from commerce and industry, the costs and prices of everything nec-

LEADERS FOR HALF A CENTURY

TOOL CRIBS and PARTITIONS

Standard Sections Woven Wire Mesh Panels and Doors to enclose Tool Cribbs, Stock rooms and other enclosures.



IMMEDIATE DELIVERY

Write for Catalog

Acme WIRE & IRON WORKS

3527 E. CANFIELD — DETROIT 7, MICH.

When you're glad
you have a
Snap-on

Snap-on
Octo-Grip
SCREW DRIVERS

● Use of the right screw driver for the job is a factor which, multiplied many times during the course of a working day, affects production importantly. Snap-on helps you select the right screw driver . . . makes more than 75 different models, including Phillips screw drivers in both one piece and detachable heads, Reed & Prince drivers, offset and hammer head and spark testing drivers . . . in fact, every type of screw driver needed for industrial use.

Snap-on OCTO-GRIP screw drivers in particular are built for modern production needs . . . with nickel-molybdenum alloy steel blades . . . tested precision ground hard-

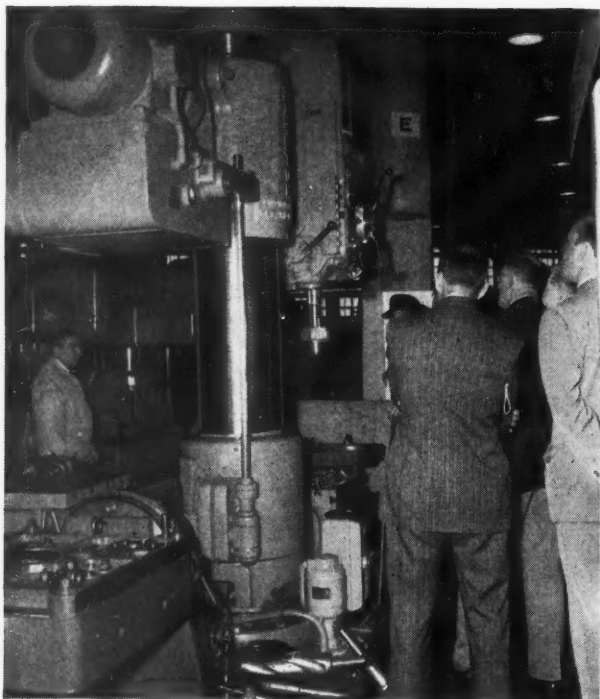
tempered tips, non-slip shock-proof OCTO-GRIP plastic handles.

Snap-on screw drivers, like Snap-on's 4,000 other tools, are distributed through 40 factory branches, one of which is conveniently near you. Write for information.

SNAP-ON TOOLS CORPORATION

8032-K 28th AVENUE • KENOSHA, WISCONSIN
International Division; Kenosha, Wis., U. S. A.

Snap-on Tools
THE CHOICE OF BETTER MECHANICS



This radial drilling machine is a good example of the tools built by American manufacturers. These machines will be found in shipyards, railroad shops, job shops and similar plants throughout the world.

bent their efforts toward the development of better machines and tools for production.

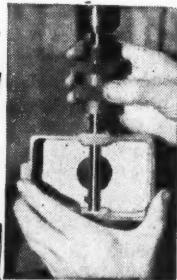
Machine tool builders, especially have assumed the task of developing machines with which production could be increased without increasing costs. At the recent Machine Tool Show which was held in Chicago the newest of these designs were placed

most other cases, in order to obtain a fair margin of profit on invested money the manufacturers have increased their prices — and these increased prices have all been reflected in the increased costs of living. In an effort to successfully combat this situation, tool and machine designers have

upon display for the manufacturing world to see. For ten days—September 16 to 26—manufacturers and engineers from all parts of the world gathered at Chicago to see what the Yankee ingenuity had brought forth that they could use profitably in their own plants.

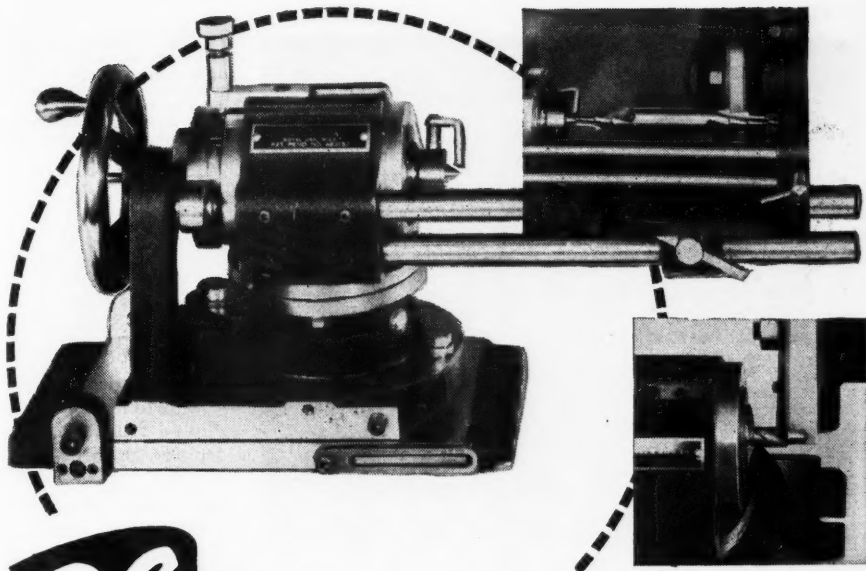
How to remove burrs - FASTER, EASIER, BETTER!

With the new NOBUR tool you can burr holes faster—improve the finish of deburred parts and lower production costs by eliminating burring as a bench operation. The NOBUR tool works like a drill, making burring a fast, easy machine operation. The NOBUR tool is available in 1/16" progressive sizes from 3/16" to 1" in diameter. Write today for new complete burring folder.



NOBUR MANUFACTURING COMPANY

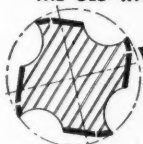
910 North Orange Drive, Los Angeles 38, California



GRINDS RADIAL RELIEF PRESERVING ANY FORM

Gives You Better Cutters, Better Finish!

THE OLD WAY



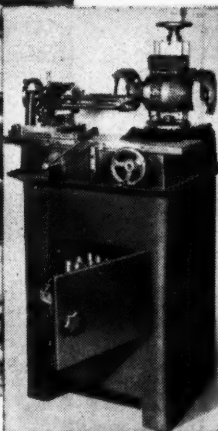
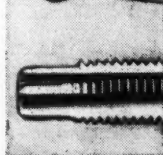
THE NEW WAY

RADIAL RELIEF
ANGULAR RELIEF



D-S makes a once difficult grinding job easy and simple. Any good grinder hand can relieve even complicated forms, eccentrically to a clean cutting edge.

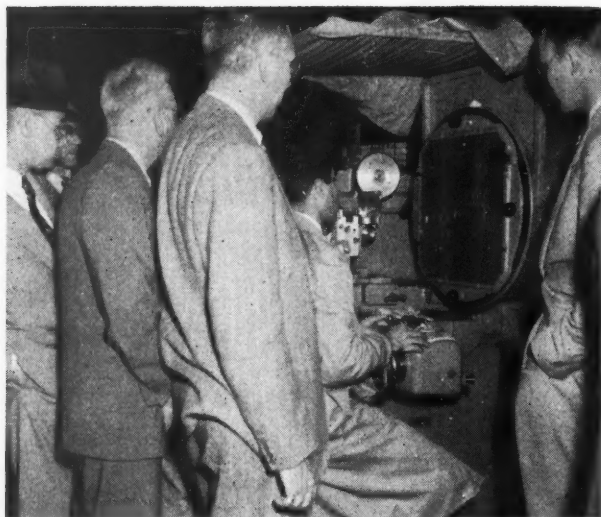
Lands can be left parallel with flutes. No undercuts necessary. For step drills, taps, reamers, profile cutters, gear tooth rounding cutters, etc.



**D-S GRINDER DIVISION
ROYAL OAK TOOL AND MACHINE CO.**

621 East Fourth Street • Royal Oak, Mich.

WRITE FOR OUR CATALOG



The "Projecto - form" grinding machine drew an audience; here was a machine equipped with an optical comparator with which the operator could check the progress of the operation as the grinding proceeded.

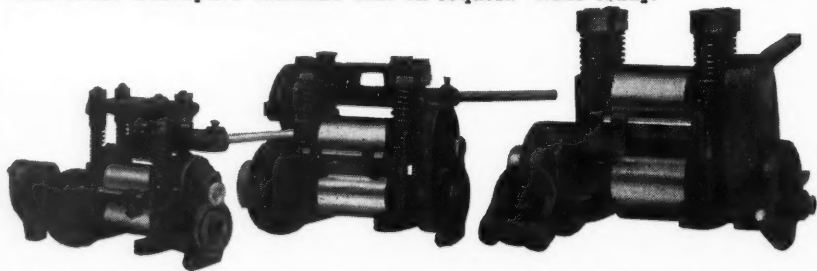
Switzerland, Australia, South America and other countries moved from one exhibit to another, trying the levers, moving the carriages on the lathes, feeding the tailstocks in and

In those ten days approximately 180,000 people from as far away as India, Japan, China, South Africa,

out, asking questions, and watching the demonstrators as they put the various machines through their paces.

La BAHN *Universal* ROLLFEED

Available in both plain and geared types up to 10½" advance. Plain types illustrated. Automatic ROLLFEED is adaptable to fit all punch presses. Good deliveries! Descriptive literature sent on request. Write today.



No. 1—1½"
Maximum Advance

No. 3—1¾"
Maximum Advance

No. 5—2¾"
Maximum Advance

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SCHULTZ and ANDERSON

111 EDISON PLACE

NEWARK 5, N. J.

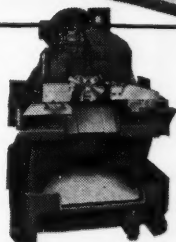


PROOF- you can get finished parts FASTER with the new Acme-Gridley 12" Chuck-matic

This new single spindle chucker is built for heavy-duty cutting and a minimum of idle time for loading and unloading.

The typical machine times shown above aren't theoretical. They're only a few examples of the kind of work (both short and long run) you can turn out in less time—accurately—at lower cost.

If you're doing heavy-duty chucking work, you'll be interested in a new book we've prepared. It shows 16 jobs similar to the one above—all done on the Chuck-matic. Ask for bulletin SC 46-A.

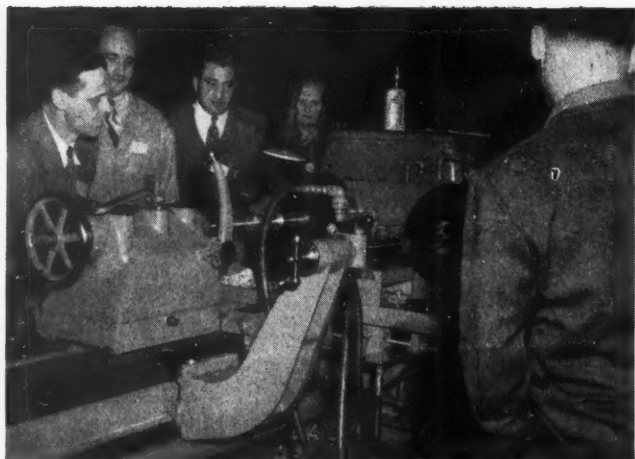


The rugged, powerful Chuck-matic is built for speeds and feeds as fast as carbide-tipped tools can take it. Compact, yet simple in design, its operation is semiautomatic. An unskilled operator can run as many as four machines.

The NATIONAL ACME CO.

170 EAST 131st STREET • CLEVELAND 8, OHIO

Acme-Gridley Bar and Chucking Automatics:
1-4-B and 8 Splindle • Hydraulic Thread
Rolling Machines • Automatic Threading Dies
and Taps • The Chronolog • Limit Motor Starter
and Control Station Switches • Solenoids
Centrifuges • Contract Manufacturing



Here is a lathe equipped with a hydraulically-controlled stylus that leads the tool as it follows the design on the pattern. The machine will actually profile and write simultaneously, if the writing is incorporated in the pattern.

show how their machines and tools performed.

Some exhibitors had only one or two machines in their exhibit — only those which

Each exhibit was staffed by salesmen and demonstrators who knew the fine points of their wares perfectly and were glad to answer the questions and

they considered really new in their line. Others had perhaps a dozen machines in their exhibits, in some cases several of the same design but in

BENDS PIPE EASILY and QUICKLY at FIXED RADII

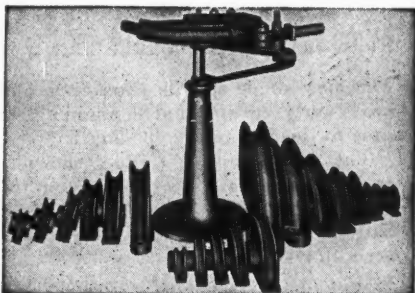
"American"

Cold Pipe, Conduit and Tube Bending Machines

Twelve types to select from. Hand operated capacities $\frac{1}{4}$ " to 6" inclusive. Motor operated $\frac{1}{4}$ " to 8" inclusive.

A few of our More Than 12,000 Customers:

Bureau of Ships, Wash., D. C.; Henry J. Kaiser Co., Pacific Bridge Co.; Bethlehem-Hingham Shipyards; Hercules Powder Co.; Stone & Webster; E. I. Du Pont de Nemours & Co.; Westinghouse Elec.; General Motors; Henry Ford Co.



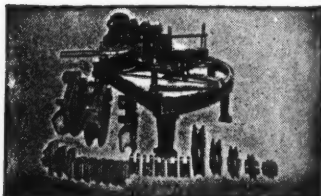
Write Air Mail for printed matter

Quick Deliveries

"American"

PIPE BENDING MACHINE
Company INC.

Factory and Main Office: 14 Furnace St., Poultney, Vermont





THE WAVY SET BLADE by MILFORD is back again!

Here is a band saw blade of unique design which, on horizontal band saw machines such as Wells, Johnson and Kalamazoo, and on all vertical cut-off machines, will . . .

- • • increase blade life an average of 30%*
- • • positively eliminate ripping of teeth
- • • cut with greater precision and closer tolerances

* from actual reports of current users

Originated by MILFORD and discontinued in the interests of standardization during the war. The efficiency of this blade, however, has been so thoroughly demonstrated on the horizontal type of machines now extensively in use, that the 3/4" 10 and 12-tooth wavy set sizes have been added to the standard list and are available for immediate shipment.

Your own machines are your best proving ground. Test a MILFORD WAVY SET BLADE against the field!

Order from your Mill Supply Distributor. He is always ready to serve your needs for all factory and mill supplies as well as MILFORD hack saw and band saw blades.

MILFORD

PROFILE AND
BAND SAW BLADES
RESISTOR AND DUPLEX
HACK SAW BLADES

THE HENRY G. THOMPSON & SON CO.

Saw Specialists Exclusively for Over 65 Years
NEW HAVEN 5, CONNECTICUT, U. S. A.



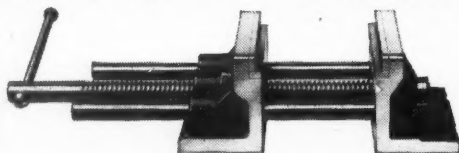
Watching a special Triplex milling machine as it finishes three surfaces in a single operation.

different sizes, all operating under power and producing on actual or test workpieces. In many cases the visitor was invited to try the machine himself so that he could discover how easily and accurately it operated. Some of the demonstrators were women and

girls, thus proving to the visitor that the equipment was easy to operate.

The gear shaper is a familiar piece of equipment to most production men, but heretofore one has thought of the gear shaper as having a single cutter that worked upon a single gear, or

DRILL FROM 3 SIDES WITH THIS HANDY VISE



Two sizes: Jaws 6" wide x 2" deep . . . \$24.50
Jaws 8" wide x 3" deep . . . \$30.00

Jaw sides of the Heinrich Handy Drill Press Vise are precision ground at right angles to parallels . . . makes possible accurate drilling from any direction without resetting work. Built-in parallels in jaws level work quickly. 2" clearance from parallels to table and widely spaced jaws permit drilling clear through work. Built-in V-groove holds round stock firmly for side and end drilling. Light weight for easy handling. Write for full details today.

NATIONAL MACHINE TOOL CO. • Dept. 117 - L • Racine, Wisconsin

BAY STATE
40 to 1 ²⁵⁷ *with Bagflex**

These are typical performance reports
 we suggest you do a little arithmetic

Your Question:
 If one Bayflex disc outperforms the ordinary coated abrasive disc 40 to 1, how much will I save per year?

In your calculation you may neglect the cost of our disc wheel. Its cost is completely absorbed in the waste time saved in changing 39 ordinary discs. Yes, turned into dollars, the saving in labor cost for slacking 39 nuts, removing 39 ordinary discs, replacing 39 ordinary discs, tightening 39 nuts — gives you our disc wheel free. Please do the arithmetic. The chances are better than 40 to 1 it will pay you handsomely to buy Bayflex.

Standard sizes in a range of grits available for stock shipment. Send for descriptive literature and prices.

Branch offices & warehouses
 Chicago — Detroit
 Distributors — All principal cities

**BUILT-IN FLEXIBILITY — PLUS
 FOR MAXIMUM SAFETY
 AND CUTTING SPEED**
A-36J BAYFLEX

**Unexcelled for
 cleaning castings**

BAY STATE

For waste on angle iron frames. For hard-to-get-at places. Hundreds of uses in auto repair shops. Has no equal for smoothing welds.

U. S. Pat. Off. (Resilient Abrasive Wheels) Mfg. by Bay State Abrasive Products Co.

Top Performance Consistently Duplicated
BAY STATE ABRASIVE PRODUCTS CO. • WESTBORO, MASSACHUSETTS, U.S.A.

32 ALUNDUM® ...



NORTON COMPANY
ALUNDUM
WORCESTER MASS. U.S.A.

Its Cost-cutting Ability Now PROVED *by a Year of Sensational Performance!*

THE sensational performance of 32 ALUNDUM grinding wheels is no longer a prediction—it is now an established fact—definitely proved in thousands of plants the country over by a solid year of steadily increasing use. The reason for their outstanding success is 32 ALUNDUM abrasive—entirely different from any other abrasive—made without crushing by a Norton developed and patented process.

"32" Wheels Are Sharper

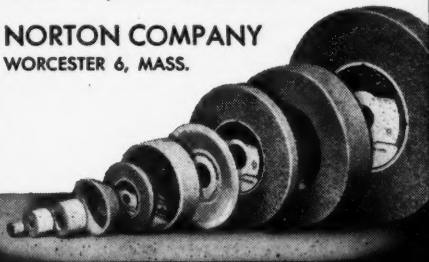
Each grain of 32 ALUNDUM abrasive forms as a single, complete crystal with many sharp points on all sides for faster, cooler cutting.

"32" Wheels Contain More Usable Abrasive

The grains of 32 ALUNDUM abrasive are over 99% pure fused alumina—no non-cutting slag nor pores. Their greater resistance to dulling gives longer wheel life.

32 ALUNDUM grinding wheels are available in all standard sizes—in both regular and open structures. They can cut costs for you on cylindrical, centerless, surface, tool and internal grinding. Ask your Norton abrasive engineer or Norton distributor for specific recommendations.

NORTON COMPANY
WORCESTER 6, MASS.



NORTON ABRASIVES

OUT TO BREAK SPEED PLUS

ECONOMY RECORDS!

The New BULLARD Type "K" Mult-Au-Matics Set the Pace For Small and Medium Size Jobs

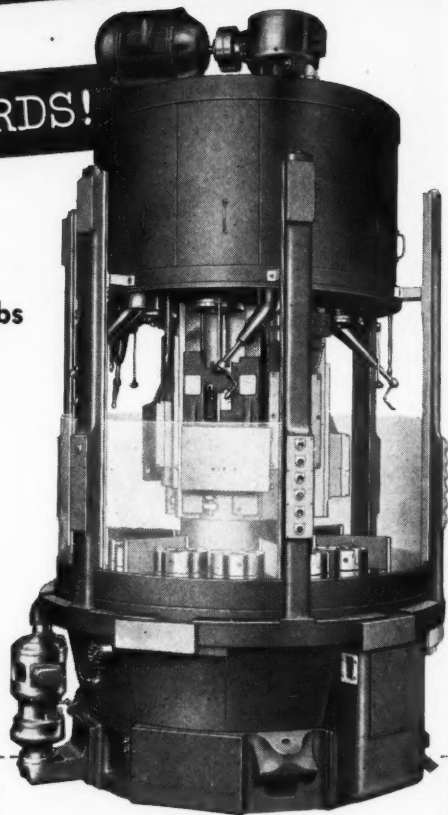
Designed primarily for small and medium-sized jobs of aluminum, magnesium and other alloys, the new Bullard Type "K" Mult-Au-Matic brings greatly increased speed and new economies to such types of work. New Features include:

1. Higher Spindle Speeds—41 speed changes, 82 rates of feed, selective feeds and common speeds at all stations. And spindle speeds have been increased up to 900 rpm . . . *three times the speed ever before available.*

2. Less Time For Index Cycle—Chucks are automatically opened at the loading station, and closed by a foot treadle. Operator's hands are free for proper chucking, and the carrier automatically indexes when the last operating head returns to "neutral".

3. Twin Spindle Applications—Offering to small jobs a choice of advantages—two pieces for every machine index cycle, or double the production. (Single spindles available if required.)

In design, construction and performance, the new Type "K" Mult-Au-Matic offers many advantages worth investigating for your own production . . . Write for details. THE BULLARD COMPANY, Bridgeport 2, Conn.



The BULLARD Type "K" Mult-Au-Matics for work up to 10" in diameter, are available in four models; 6 or 12 spindles with spindle speeds at 100 to 900 rpm, and 8 or 16 spindles with spindle speeds at 98 to 883 rpm.

BULLARD

BULLARD CREATES **NEW METHODS** TO MAKE MACHINES DO MORE

The operator of this machine could trace the outline of the workpiece on the drawing with the aid of a stylus, at the same time checking the progress of the operation through the magnifying eye-piece. This machine was known as the "Micro-form Grinder."

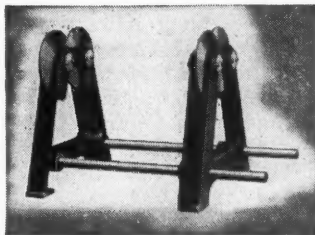


perhaps multiple cutters working upon a multiple gear.

Here at the show the visitor saw a rotary gear shaping machine designed with ten individual gear cutting units, turret-mounted to rotate on a single base. With this machine ten gears can be machined simultaneously and the ten gears can be of ten different kinds and sizes. The machine is controlled by a small push-button switchboard and every moving part is easily manipulated, although

the machine itself is so huge that part of the wall of the exhibition hall had to be removed in order to get the machine into the building.

Although practically all engineers or production men have at one time or another seen a cam-grinding machine in operation, there was always an interested group around a cam grinder which was designed to work automa-



Anderson

BALANCING WAYS

In any shop where rotating parts are handled this simple, sturdy and thoroughly dependable device will quickly prove its efficiency for accurate balancing and truing operations. It assures better work... saves time and labor. No leveling required.

Four chilled iron discs rotate with minimum friction on sensitive special bearings, giving a quick, accurate indication of whether or not the work is in perfect balance.

Write for Bulletin 11-22

ANDERSON BROS. MFG. CO., Rockford, Ill.

Swing	Distance Between Standards	Capacity in lbs.
20 in.	20 in.	1,000
40 in.	30 in.	2,000
60 in.	30 in.	2,000
72 in.	66 in.	5,000
96 in.	88 in.	10,000



At each stroke of this "Cincinnati" brake a steel cane was formed from a strip of steel—and there was always a visitor there to accept it.



ically, grinding a cam to size, moving to the next one and repeating the operation, and so on until all the cams on the shaft had been completed. This was only one of many machines at the show which, uncannily, seemed to be controlled by invisible hands.

Coming upon a single file of people extending in a line perhaps a block long, we discovered that this line was passing a bending and forming press

where narrow sheets of steel were being transformed, at each operation of the press, into light but serviceable canes which one could either use to point when asking a question, or to poke at a demonstrator to engage his attention, or perhaps to take home to serve the decrepit grandfather.

It was a poor exhibit indeed that did not attract a crowd, for the guests included not only the high-powered executives and engineers from the great manufacturing plants, but also the owners and shop executives of the smaller industries, tool and die shops, job shops, and so on. Each was trying to find equipment that would make it possible for him to increase his production, lower his manufacturing costs, turn out a better and more accurate product, or perhaps to give better service to his customers.

One of the popular exhibits was a centerless thread grinding machine at work generating threads in small headless setscrews, feeding the screws to the wheel from a hopper which aligned them automatically. In another booth a huge planer-type milling machine was busy milling the surfaces

**CARROLL
AND
JAMIESON
LATHES**

16"

12 Speed Geared
Head Motor Drive
Timken Mounted
Spindle.

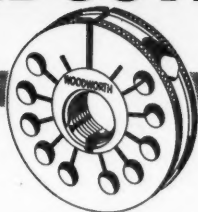
Modern Design—
Liberal
Dimensions.

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Bulletin.*

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MACHINE TOOL CO.**

WOODWORTH GAGES *ACCEPTED* BY ALL INDUSTRY !

GREEN—GO



RED—NOT GO



Industry by industry—coast to coast—
wherever accuracy and durability count—
Woodworth Company is winning and
holding new friends—with the **ACCEPTED**
ADJUSTABLE THREAD RING GAGE.



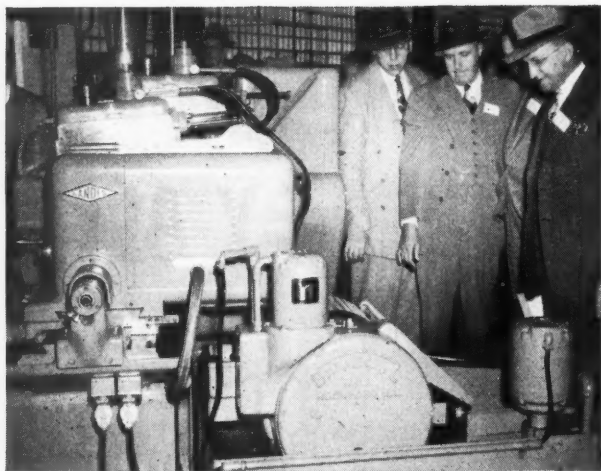
ACCURACY YOU CAN TRUST

SEND FOR—The new 1948 Woodworth Gage Catalog just off the presses. Requests for copies must be written on company letterheads.

★ There's a Woodworth representative near to serve you. Write us for his name.

WOODWORTH

N. A. WOODWORTH CO., 1300 EAST NINE MILE ROAD • DETROIT 20, MICHIGAN
COMPLETE LINE OF PRECISION GAGES • DIAPHRAGM CHUCKS • CONE-LOK JIGS



Centerless grinding threads on parts that were hopper-fed to the grinder was a new idea to many, but this machine performed continuously throughout the show. The visitor at the right is watching the Barnesdrill separator clean the steel "swarf" out of the grinding compound.

of three different sets of workpieces all attached to a single fixture; some on one side of the fixture, some on the other, and some on the top. The table

cutters used in the demonstration were 14 in. carbide-face mills.

One of the best examples of engineering genius was a machine equip-

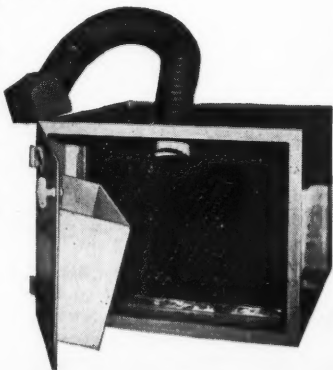
feed rate on this machine ranges from $\frac{1}{2}$ in. to 50 in. a minute with a rapid traverse rate of 300 in. All the

DUST COLLECTOR

for Surface Grinders, etc.

The Type S is an inexpensive dust collector designed for machines which are used intermittently and which cannot readily be connected to an exhaust system. Easily moved around shop.

The front of the box is a hinged door for easy inspection. Capacity—325 CFM at $3\frac{1}{4}$ " W. G. Static suction of 2" W. G. in a suction nozzle with 4' of 3" dia. flexible metal hose. $\frac{1}{2}$ H. P. motor.



Write for illustrated folder.
Inquiries from dealers
invited.



COLONIAL BLOWER CO.

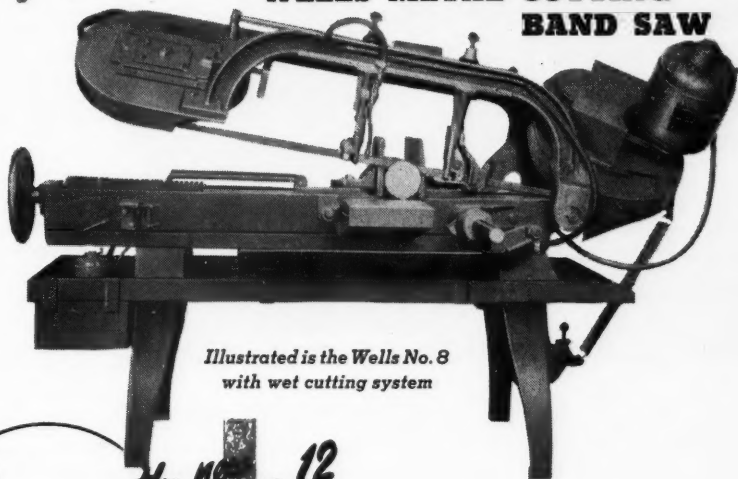
17 FRANCIS AVE.

HARTFORD, CONN.

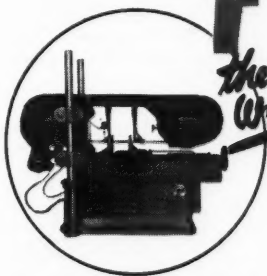
there is

No Lost Time

when you cut with a
**WELLS METAL CUTTING
BAND SAW**



Illustrated is the Wells No. 8
with wet cutting system



*the new
Wells no 12*

The revolutionary new Wells No. 12 features an automatic hydraulically controlled cutting cycle and controlled blade pressure. It will handle rectangular shapes up to 12" x 16" and rounds to 12 3/4" O.D. It operates at selective speeds of 60, 90 and 150 feet per minute.

You'll get the job done faster with a Wells Band Saw because the cutting action is continuous. There is no wasted motion. Service records in hundreds of leading plants prove that Well Saws reduce cutting time, yet they are versatile and economical. Ask your dealer for a demonstration or write direct.

Specifications - Wells No. 8

CAPACITY:

Rectangular 8" x 16"
Special Guides 5" x 24"
Rounds 8" O. D.

MOTOR 1/2 H.P., A.C. or D.C.

SPEEDS Selective; 60, 90, 130 feet per minute

WEIGHT Approximately 665 pounds

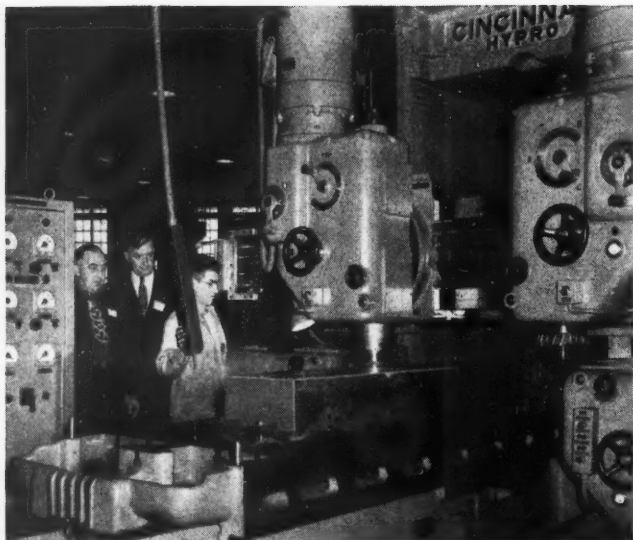
Wells Saws
the best at cutting

Wells

Products by Wells are Practical

METAL CUTTING BAND SAWS

WELLS MANUFACTURING CORPORATION
308 TYLER STREET, THREE RIVERS, MICH.



Watching a demonstrator guiding the heads and cutters on his planer-type miller by electronic controls.

was a new idea. The machine is actually a cutter grinding machine specifically designed for the grinding of extremely accurate small profile shapes; the projector is simply an added accessory—but an extremely valuable one. While the grinding operation

is in process, the optically enlarged image of the work may continuously be compared with an enlarged scale master drawing, making it possible for the operator to work to extremely close limits before measuring or removing the workpiece.

Another form grinding machine, the design of which included an optical instrument, was a form grinder designed for the grinding of both circular and flat form tools, templates, and similar pieces, working directly from the drawing. Designed upon the panto-

ped with an arm which picked the workpiece out of the chuck upon completion of the first operation and moved it to one side where another tool performed a second operation before the piece was released.

The optical projector which enlarges and reproduces the shape of a tooth, tool or small workpiece on a large ground glass is one with which practically all production men are familiar, but the projector with which one could see an enlarged image of a grinding wheel at work upon a cutter

12"



(FROM 1/8" to 1/2"—BY 1/64'S INCLUSIVE)

DRILLS!

12" LONG

HIGH SPEED STRAIGHT SHANK DRILLS
9-Inch Flute
Immediate Delivery

Eastern Tool Supply Co., Inc.

176 Grand St., New York 9, N. Y.

FREE COPY

MACHINE SHOP CATALOG—125 page fully illustrated catalog describes a large variety of drills, reamers, cutting and lathe tools, vises, etc.

**The accurate
fast way**
to gage inside dimensions
from .122" up

FEDERAL

Federal offers a Dial Indicator Gage exactly suited to checking any inside dimension from .122" up to 12.665". The recess may be shallow or deep; the opening offset or even blind. Roundness, taper or other eccentricities can be measured throughout the total depth.

The reading on the Dial Indicator is immediately visible; the exact amount of variation is shown. You know instead of guessing.

The Federal line comprises many stock models of various types for gaging inside dimensions. Federal Engineers have also designed more than 10,000 special gages to meet unusual conditions, including gages to check several dimensions simultaneously. We invite you to write for illustrated Bulletin No. 94.



For exceptional accuracy—and for certain exceptional requirements—the Federal Metricator Air Gage is both highly adaptable and the simplest in construction of all air gages.

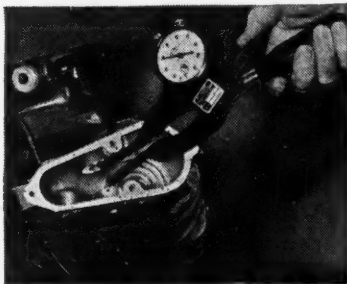


The various models in Series 1201 show instantly the dimensional variations in all diameters from .500" to 12.665"; measuring lengths range from 3" to 12".



FEDERAL PRODUCTS CORPORATION
1144 Eddy St., Providence 1, R. I.

Model 1203 — with 12 interchangeable gaging plugs — checks all hole sizes from .122" to .250". (Model 1204 covers the range from .250" to .500").



Model 149 Caliper Type Gages are adaptable—with arms built to specifications—to many uses; they are convenient and great time-savers.

• Dimensional Dial Indicators and Indicating Gages—mechanical, electronic, air, multi-dimensional • Automatic Sorting • Dimensional Machine Control • Combinations of these methods.

A cam grinder that finished all the cams on the shaft without attention from the operator drew its quota of attention.

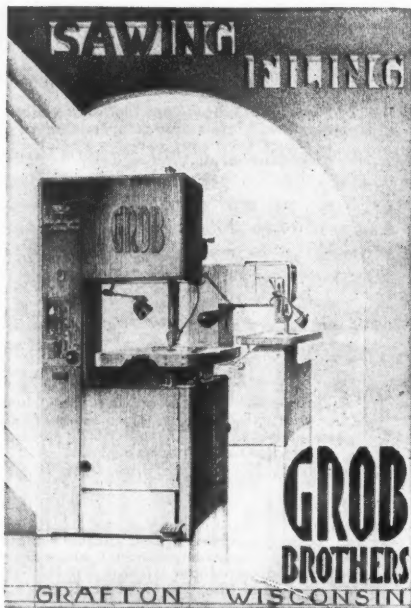


graph principle, the design makes it possible for the operator to trace the lines on the drawing with a stylus, the grinding wheel following the motion of the stylus on a 1-to-50 ratio. It was said that an accuracy of 0.0003 in. is easily obtained.

The lathe was man's first machine tool, and variations in lathe design are

always interesting. One exhibit that attracted its full share of attention was a lathe equipped with a shaft upon which was mounted a form that was machined to the exact dimensions of a finished workpiece. With a workpiece between the lathe centers and a tool cutting, an air-operated tracer followed the contour of the pattern, leading the tool to duplicate the movement and thus produce a finished piece which was accurate in every detail. On a piece of irregular design, such as perhaps a bottle mould, the saving through the elimination of time otherwise required for measuring and re-setting the tool is obvious. Further, any number of pieces can be duplicated exactly, without the necessity of touching the tool controls while the operation is in progress.

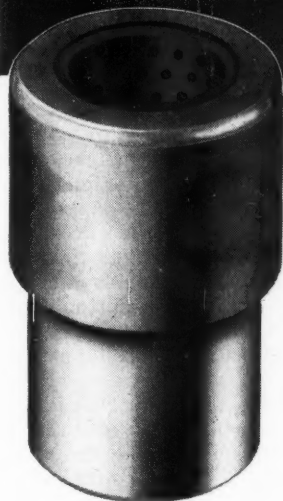
In another exhibit a lathe equipped with hydraulic controls accurately reproduced a pattern to the last detail. With this machine the operator was turning and boring parts upon which the machine was reproducing letters, figures, cross lines, and all sorts of intricate designs. This machine will trace a compound curve or will accurately follow the "flats" on a square



"Standard"

INDIUM BRONZE GUIDE PIN BUSHINGS

FOR REPLACEMENTS



Write for Bulletin LB.

INDIUM—the low friction metal with inherent lubricating qualities — permits higher safe operating speeds, and prolongs die set life. The "Standard" basic steel bushing is lined with special bearing-bronze alloyed with INDIUM, providing a non-ferrous bearing surface with indented spherical oil pockets that retain lubricant under the highest pressures. "Standard" INDIUM Bronze Bushings, ground with extreme accuracy, are interchangeable with stock die set bushings. They are available in sizes 1" to 3" I.D.

Replace your present guide pin bushings with "Standard" INDIUM Bronze Bushings and "Standard" Super-finished Guide Pins — specify INDIUM Bronze Bushings on your new "Standard" Die Sets.

LOW FRICTION MEANS LONG LIFE

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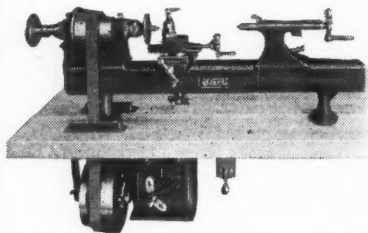
Fidelity Tool Supply
309 Vine St.
CAmden 4-7765

WORCESTER

Lindco, Incorporated
1023 Southbridge St.
WORcester 6-4637

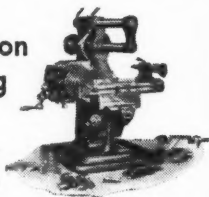


Integral Drive Precision Bench Lathes. Double-taper headstock bearings of highest accuracy, or best precision pre-loaded ball bearings. Two good sizes $\frac{3}{4}$ " and 1". 30 Precision attachments available.



Open Cone Lathes world-known. Four sizes, with compact under-bench Motor Drive Unit.

Stark Precision Bench Milling Machine.
Plain and Spiral Models



"ELECTROBLAST" High Speed Muffle Furnace. Two excellent small sizes.

Stark Tool Company

WALTHAM • MASSACHUSETTS
ESTABLISHED • 1862

Originators of the American Bench Lathe

milk bottle or any other intricate bottle design. The machine will actually "write" by following the writing on the pattern. With such machines as these industry not only can turn out more accurate work, but perhaps will be able to increase production enough to offset the abnormally high manufacturing costs.

Discovery of ways to smash the atom have labeled our present era the "Atomic Age," but for most practical purposes it should still be considered as "The Electronic Age." Electronics are being employed today to control mechanisms for doing a large part of our work. One of the exhibitors showed a planer - type miller to which an electronic mechanism has been harnessed so that any one or all of four cutters, operating either singly or in unison, can be controlled completely by push buttons. In fact, the entire operation of the machine is controlled from the pendant push-button control board; thus the work, heads, and cutters can be made to do almost anything the operator desires as fast as his fingers can follow his thought.

The automatic screw machine has long been an outstanding example of modern tooling, consequently the "automatics" in operation in a number of booths received their full quotas of attention. The engineer or plant executive is blasé indeed who is not intrigued by the swift movement of the screw machine slides, cutters and tools as they move by invisible power to the work, perform their task, and back away so that the workpieces may move to the succeeding stations in the machine.

One of the more modern pieces of equipment is a mechanical unit that can be attached to any boring mill, drill press, or other machine to control the successive movements of the tools automatically so that, once set in motion, the machine will follow a pre-determined machining plan and



Continental CUTTING TOOLS

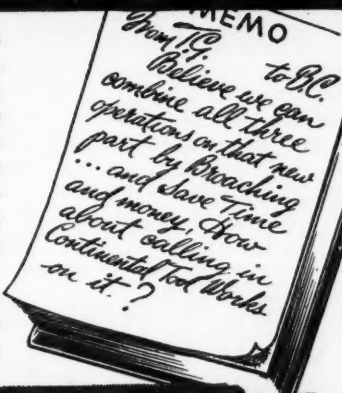
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Broaches
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Form Relieved Cutters
Milling Cutters
Thread Milling Cutters
End Mills
Side Mills
High Speed Steel Reamers
Carbide Tipped Reamers
Shell Reamers
Inverted Spoolcorks
High Speed Steel Tool Bits
Carbide Tipped Tool Bits
Circular Form Tools
Cut-off Tools
Flat Form Tools
Dovetail Form Tools



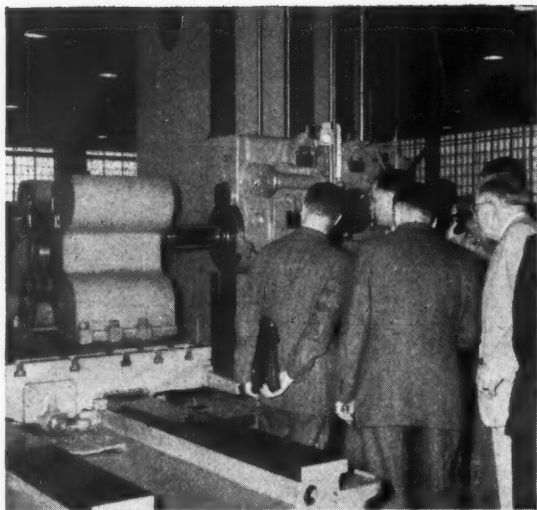
CONTINENTAL BROACHES

Precision Ground by Experts

The 26 years experience of Continental engineers assures you that each broach is exactly fitted, in design and workmanship, for the job it is intended to do. Each is ground to exceptionally close tolerances by a skilled broach-maker. Continental makes a complete range of internal and external (surface) broaches, fixtures, holders and pullers, all to the same high standards. Call Continental today.



CONTINENTAL TOOL WORKS
DIVISION OF EX-CELL-O CORPORATION
DETROIT 6, MICHIGAN



The big horizontal boring machines drew their share of attention. With this machine one could practically machine a small-size house.

essary for the operator to stop the machine in order to measure the piece or to change the feeds or speeds, and the automatic control never gets tired.

The large machines designed for job shop or tool work, or for production work on pieces too large for machining in the smaller machines with automatic controls, came in for their share of attention. Pendant push-button

the boring, turning, facing and other tools will follow each other in the proper order and at the proper time, eliminating the need for tool setting, measuring, and gauging.

Used in connection with a huge drilling machine, it automatically controls the spacing of the holes so that accurate work can be produced and reproduced without the use of large, expensive templates and jigs. Applied to a new type of horizontal lathe, this device will automatically control 39 different and entirely unrelated functions in any desired sequence. It is unnec-

switchboard providing centralized finger-tip control, complete automatic operation of every part of the machine, finer fits and more versatile adjustments, remote controls, and other features of design characterized many of these machines.

Machine shops in every part of the earth will be found equipped with radial drills such as this, preferred by their owners because of the versatility, accuracy, sturdiness, and ease of control which are the outstanding features of American-made machines. Several different makes of radial drill-



HINGES

**VARIOUS WIDTHS
and GAUGES**



**BUTTS AND
CONTINUOUS LENGTHS**

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S & S MACHINE WORKS

4533 W. LAKE STREET HARDWARE DIVISION CHICAGO, 24, ILLINOIS

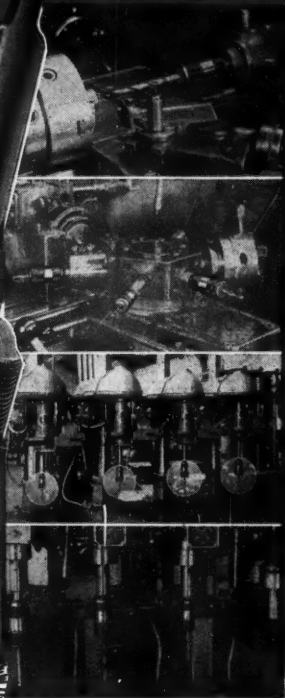
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**GUARDS
CABINETS
CASES
BOXES**

SAVE TIME

STEP UP PRODUCTION!

"KNOCK-OUT" CHUCKS ARE FAST • POSITIVE • NON-SLIP

A twist of the wrist tightens or loosens this self-energizing chuck. The heavier the work-load the tighter its 3 hardened jaws grip the tool with a radial pressure that prevents twist or slip. Its fast, positive action saves time—saves tools—steps up production.



"KNOCK-OUT" EXPANDING MANDRELS STEP UP PRODUCTION ON TURNING, MILLING AND GRINDING OPERATIONS

SIMPLE—FAST—ACCURATE. "Knock-Out" Expanding Mandrels hold work from $\frac{3}{8}$ " to $5\frac{1}{2}$ " hole. Perfect support without distortion for thin wall sleeves—sure, positive grip on heavy pieces. Ideal for production or tool-room.



K.O. LEE COMPANY

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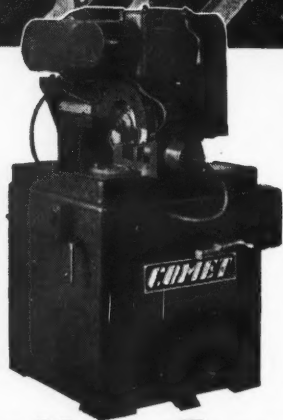
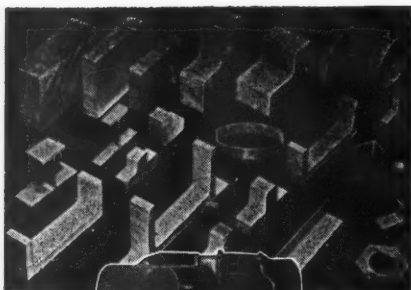
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If you require accurate, high-speed cutting of non-ferrous metals and other materials, here is your machine. Cuts by smooth, fast, milling action. Pneumatic hydraulic feed is coordinated with speed of cutting blade. Vise synchronized with action of ram. No vibration because of weight distribution. Has 4 speed transmission and variable feed mechanism. Built-in coolant system. Properly operated, blade breakage is eliminated. Write or wire for free literature.

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2031 SANTA FE AVE., LOS ANGELES, 21, CALIF.

COMET
AUTOMATIC CUT-OFF MACHINE
MODEL MH

ing machines made by American manufacturers were on display and attracted their quotas of visitors.

The 1947 Machine Tool Show lived up to its advance notices; it was really the greatest industrial exhibit ever held in America, and probably in the world.

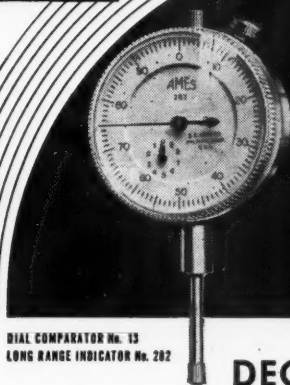
Profilometer Equipment. An illustrated catalog on Profilometer equipment for measuring surface roughness in micro-inches is announced by the Physicists Research Co., 321 S. Main St., Ann Arbor, Mich. The catalog covers the direct-reading Profilometer, the manually-operated general-purpose Type MA Tracer, and the complete line of accessory tracers for measuring in extra-deep holes, on small inside diameters, on gear teeth, and in narrow slots and grooves. Other accessories covered are the Motorace unit (for use where mechanical testing is desired), the piloting fixture, and the reading recorder.

All items listed are illustrated and described in detail, and specifications and prices are included. In addition, an introductory section discusses the application of the equipment in the shop to various production and quality control problems directly related to surface roughness. Copy of catalog free upon request.

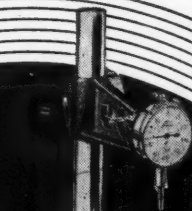
Sterling Abrasive Selector. The Sterling Tool Products Co., 363 E. Ohio St., Chicago, Ill., announces the availability of a comprehensive slide-rule type selector as a guide in the proper abrasive selection for various sanding and finishing operations. Plastic coated for durability and printed in three colors for quick and accurate reading, the selector is designed to indicate the proper abrasive combinations for 120 specific sanding and finishing problems. The selector is supplied enclosed in a convenient envelope.

According to the manufacturer, the Sterling Abrasive Selector indicates (1) the kind of abrasive for the job; (2) abrasive grit sizes for various finishing operations on many types of materials; (3) the type of coating (open, closed, waterproof, and so on); (4) lubricant to be used, if any; and (5) the proper pad to be used on the sander. Marginal notes include information of value in specific applications.

AMES



DIAL COMPARATOR No. 13
LONG RANGE INDICATOR No. 202



DECIMALS AND DOLLARS

When you want to measure those decimals with maximum dollar savings, do it with an AMES DIAL COMPARATOR such as Model No. 13 shown above. Quickly and easily set to the required dimension. Maintains its setting even with rough usage. Gives instant, *accurate* readings — independent of the human factor. You'll find no other Comparator gives you such high production while saving so much in time and labor.

The 8"-square cast-iron base may be fitted with V-blocks, anvils, or stops of various kinds. The indicator-holding bracket extends 4" over the base and is easily adjustable on the 9" column. Measuring capacity is 6". Net weight 16 lbs.

The indicator shown is one of a complete line of AMES Long Range Indicators from which you may select exactly the graduations, range, and dial reading best suited to your needs.

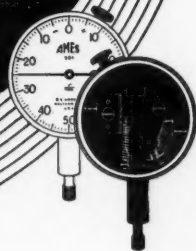
For information on our full line of Comparators and many other measuring instruments, address our Home Office:

29 Ames Street, Waltham 54, Mass.

B. C. AMES CO.

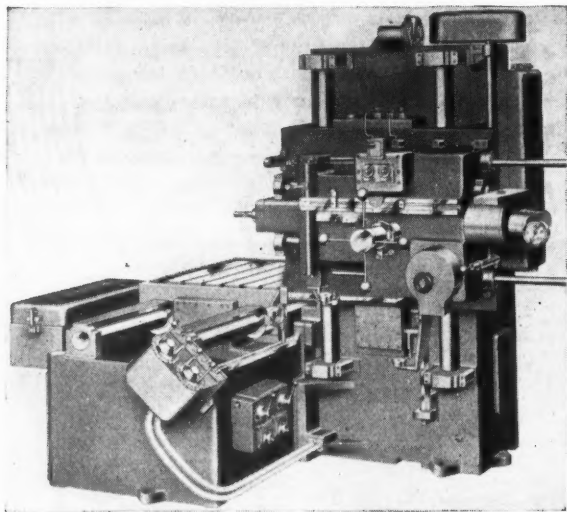
Mfr. of Micrometer Dial Gauges
Micrometer Dial Indicators

Representatives in
principal cities



New Machines Presented at the Machine Tool Show

Without previous announcement, The Bullard Co., Bridgeport 2, Conn., disclosed a new No. 20 Man-Au-Trol Locator at the Machine Tool Show. A sharp break with the past, the compact seven-ton machine tool precisely and automatically locates work in relation to a rigid, horizontal spindle for drilling, boring, reaming, tapping and allied operations. The Locator is composed of three basic elements: A table mounted on the bed of the machine and movable 20 inches longitudinally in either direction; a saddle mounted on a column and movable 20 inches vertically; and a spindle slide mounted on the saddle and movable 16 inches transversely. The same Man-Au-Trol control used on the new Bullard three-spindle horizontal lathe and the Man-Au-Trol Vertical Turret Lathe, in conjunction with position stops set with integral measuring instruments, automatically controls the relationship between the spindle and work. Once the stops are set, the operator merely dials the predetermined sequence of positions. There are 20 automatic stops for the longitudinal motion of the table



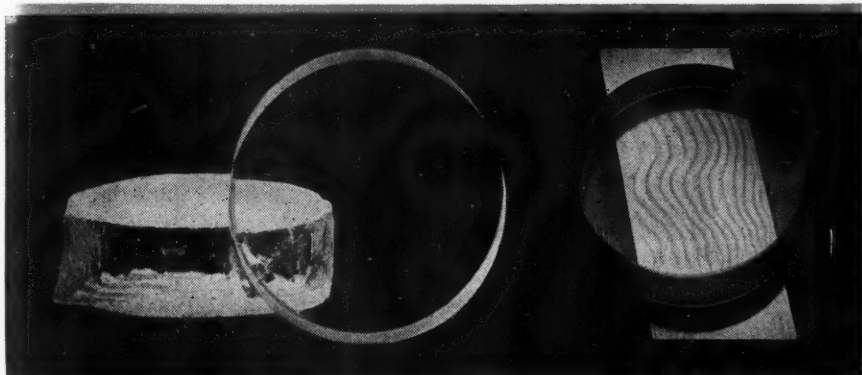
and 20 automatic stops for the vertical motion of the saddle, giving a maximum potential of 400 positions where the center lines of each operation fall upon common ordinates. The table, saddle and slide can all be operated manually at any time. Automatic operation of the spindle slide is controlled from a panel on which adjustable dogs are quickly set to control accurately the length of traverse and the rate of feed. The automatic control is hydraulic, but a wholly independent rack and pinion feed is ready at any moment where hand operation would be more suitable.

Ultimate Accuracy
IN PRECISION CHECKING
OF GAGES AND LAPPED PARTS

assured by

Van Keuren

FUSED QUARTZ OPTICAL FLATS



The use of optical flats for precision measurements with light waves was pioneered by The Van Keuren Co. in 1920. The new Van Keuren double surface, pure fused-quartz flats are the result of 25 years of experience. The accuracy and workmanship is superlative.

Fused quartz is highly transparent and has exceptional wearing qualities. The expansion and contraction due to temperature change is 1/16 that of plate glass and 1/6 that of pyrex.

Specify Van Keuren double surface, fused-quartz optical flats for checking flatness of precision lapped parts, maintenance of amplifying gages, and control of gage block wear. They are the most economical to purchase and the most accurate to use.

Worn spot .000023" deep
revealed on amplifying
gage anvil by means of a
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Consult the 160-page Van Keuren Catalog No. 33 for further details. Send for your copy.

THE *Van Keuren*

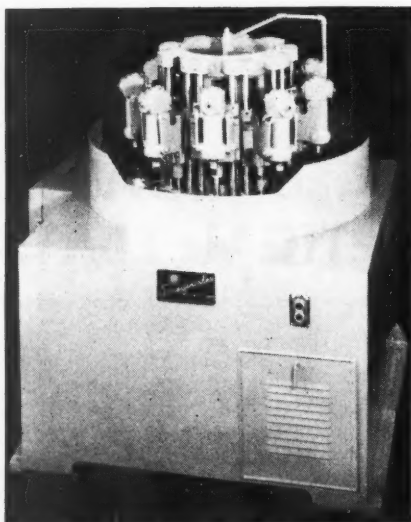
CO.,

175 WALTHAM STREET,
WATERTOWN, MASS.

Light Wave Equipment • Light Wave Micrometers • Gage
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Measuring Wires • Thread Measuring Wires • Gear Measuring
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28th YEAR

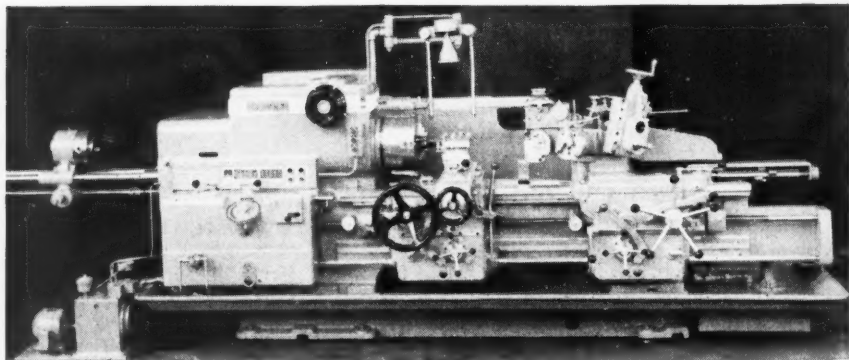
New Machines Presented At the Machine Tool Show



Visitors at the Machine Tool Show saw a Gisholt Model 53, 9-Spindle Vertical Type Flat Superfinisher with a rotating table and employing cup type stones. This machine, designed to handle a considerable variety of flat or spherical surfaces, such as automotive valve tappets and small to medium size thrust faces was production-Superfinishing a spherical section on the face of automotive valve tappets at the rate of 900 per hour. From a ground surface of 40-50 micro-inches, these tappet faces were Superfinished to surface smoothness limits of 1.5 to 3 micro-inches, Profilometer reading.



This Gisholt 1L Saddle Type Turret Lathe, manufactured by Gisholt Machine Co., Madison, Wis., was displayed machining a general line of locomotive frame bolts, link pins and bushings. The lathe is equipped with a 12-inch Gisholt chuck and hollow hydraulic cylinder, actuated by hydraulic clamp unit. The application of the hollow cylinder in the machining of typical railway repair shop parts has proved extremely valuable. Because the spindle bore is open, the machine so equipped can be used equally well for bar or chucking work without any alteration of the chucking devices. This contributes to fast changeover (frequently several times a day) from one type of work to the other where lots are small.



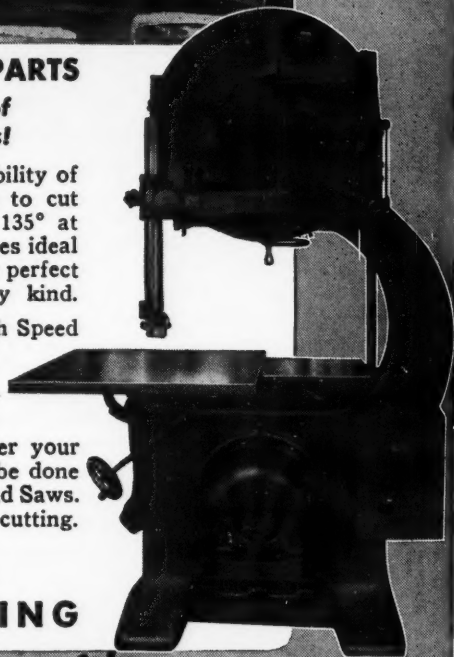
The SUPER METHOD



of TRIMMING FORMED PARTS and performing a host of other metal cutting jobs!

The negligible down-drag and the ability of Tannewitz High Speed Band Saws to cut sheet metal from 90° to near 0 or 135° at tremendous speed make these machines ideal for trimming. Cuts can be made with perfect safety without using a rest of any kind.

Friction sawing with Tannewitz High Speed Band Saws also results in perfectly amazing time savings in the cutting of flat sheets, soft or hardened steels, armor plate, plastics, glass and many other materials. Whatever your cutting problem, chances are it can be done better and faster with Tannewitz Band Saws. Investigate this "Super" method of cutting.



FRICTION SAWING

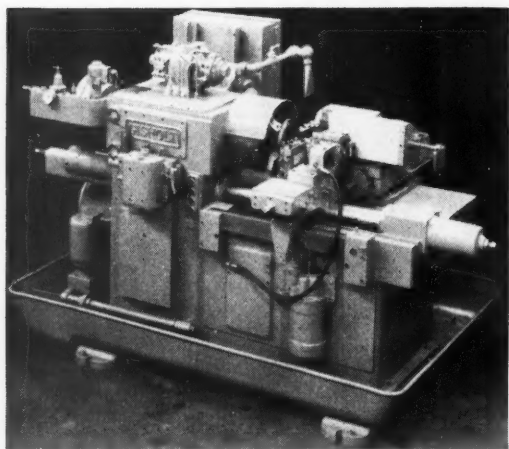
with
Tannewitz

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Free Copy

HIGH SPEED BAND SAWS

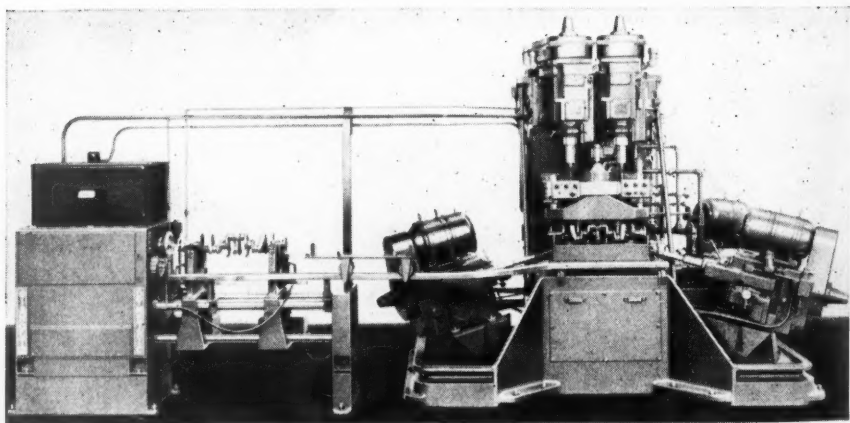
THE TANNEWITZ WORKS GRAND RAPIDS
4, MICHIGAN

New Machines Presented At the Machine Tool Show

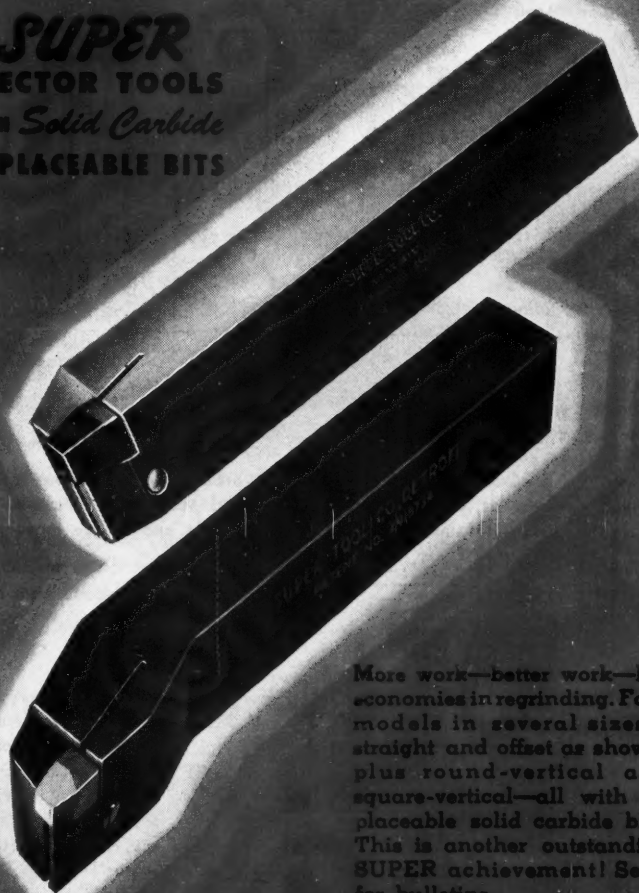


The Gisholt .No 12 Hydraulic Lathe shown herewith is equipped with 12-inch Gisholt 3-jaw air chuck and a 10-inch air cylinder. This lathe was employed to machine a stamped steel coupling cover workpiece in one chucking. This machine has a direct drive to the spindle at 1,800 revolutions per minute.

One of the featured units in the static and dynamic balancing machine section of the exhibit of Gisholt Machine Co., Madison, Wis., was a regular production display of the new, semi-automatic Gisholt two-element unit for measurement and correction of unbalance in automotive type crankshafts. Essentially, the equipment consists of two electrically connected machines—one a Gisholt Type C Balancing Machine, the second a multiple spindle drilling machine. The balancer is arranged to indicate exactly the amount of metal which should be removed from six specific points (in the crankpins and the kidney cheeks) in order to produce both static and dynamic balance. The six indications are electrically transmitted to the drilling machine, in which spindles are arranged to drill holes at the permissible correction points. The depth of each hole is automatically set from the corresponding balancing machine measurement.



SUPER
EJECTOR TOOLS
WITH *Solid Carbide*
REPLACEABLE BITS



More work—better work—big economies in regrinding. Four models in several sizes—straight and offset as shown, plus round-vertical and square-vertical—all with replaceable solid carbide bits. This is another outstanding SUPER achievement! Send for bulletins.

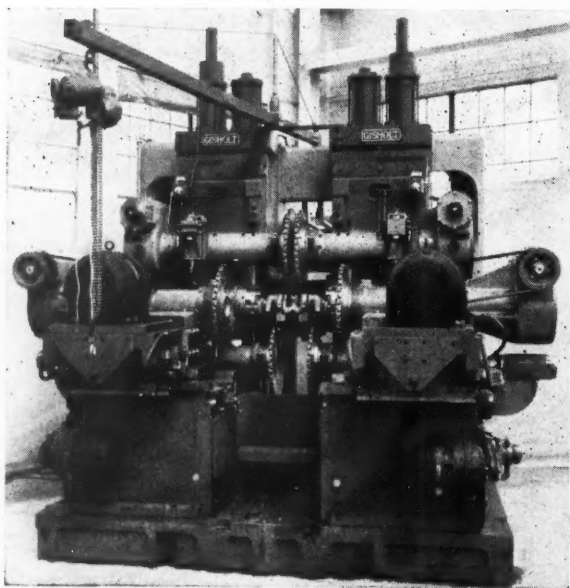
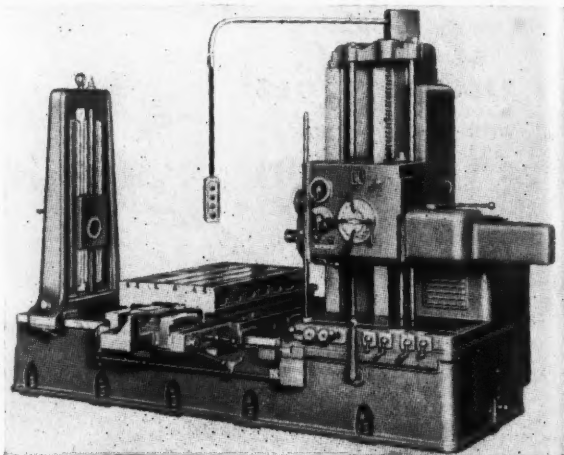
SUPER TOOL COMPANY

Carbide Tipped Tools

21650 Hoover Rd., Detroit 13, Mich. 5210 San Fernando Rd., Glendale 3, Cal.

New Machines Presented At the Machine Tool Show

A Giddings & Lewis Medium Size Model 300-T Machine was exhibited by Giddings & Lewis Machine Tool Co., Fond du Lac, Wis. The machine is designed to produce excellent finishes at high speed on average boring, drilling and carbide milling work. Although requiring only a moderate capital investment because it is smaller and more compact than other G. & L. machines, the versatile 300-T Horizontal Boring, Drilling and Milling Machine will accommodate work up to 30 inches cube in size, and 8,000 lb. in weight. The working range is made even broader by employing rotary tables, continuous feed facing heads, and other attachments and accessories. Built-in scales and verniers give readings to 0.001 inch for the headstock, table and saddle movements.



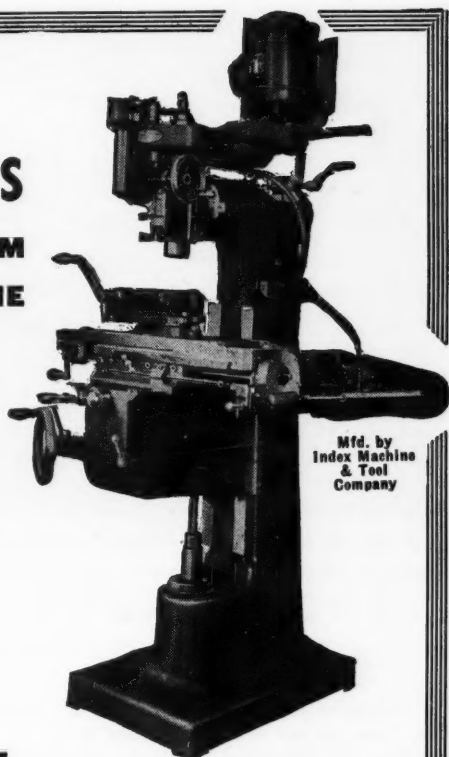
One of the truly impressive working displays in the exhibit of the Gisholt Machine Co., Madison, Wis., was a special turn mill machine, representing an important new application of old principles. This machine weighs approximately 50 tons and occupies about 143 sq. ft. of floor space. It is designed to simultaneously turn mill all the crankpins and face the adjacent cheeks and counterweights on a crankshaft to a finish ready for grinding.

INDEX VERTICAL MILLS

**FOR THE TOOL ROOM
OR PRODUCTION LINE**

For use with end mills $\frac{1}{8}$ " to 1" in steel. Equipped with verniers, as standard equipment in addition to micrometer dials on table actuating screws for locating. Further accuracy available with rods and indicators which can be furnished as extra equipment.

If you want speed and precision on milling, drilling and boring send for a catalog on Index Mills.



Mfd. by
Index Machine
& Tool
Company

12" TOOL ROOM ROTARY TABLE



A quality tool for precision work in the tool room or production line, incorporating such features as ball bearings—hardened and ground worm—quick acting throw-out for free hand turning—single movement table lock that does not cramp table out of alignment—compound trough. 12" size only.

INDEX MILLS

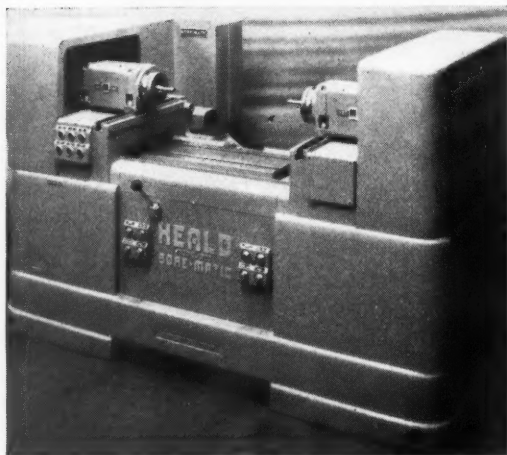
Index Mills participated in all important war production programs from camera and guns to atomic bombs. Ask any owner how they like their Index Mill.

*Write to Factory Sales and Distributing
Agents for complete information.*

BLANK & BUXTON MACHINERY CO.

**3108 E. MICHIGAN AVE.
JACKSON, MICHIGAN**

New Machines Presented At the Machine Tool Show

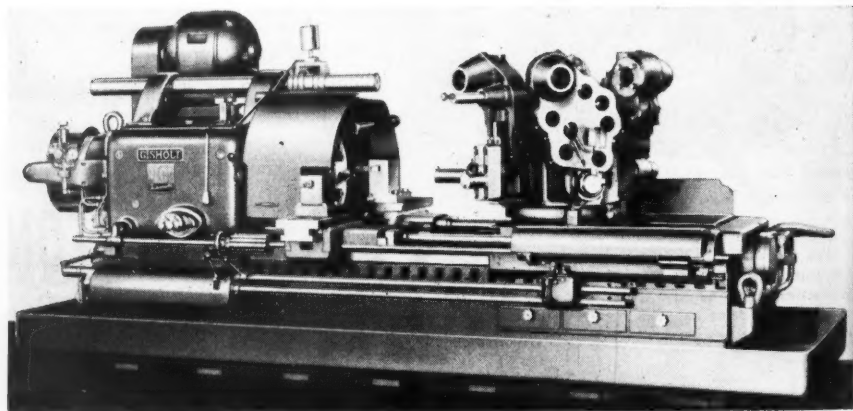


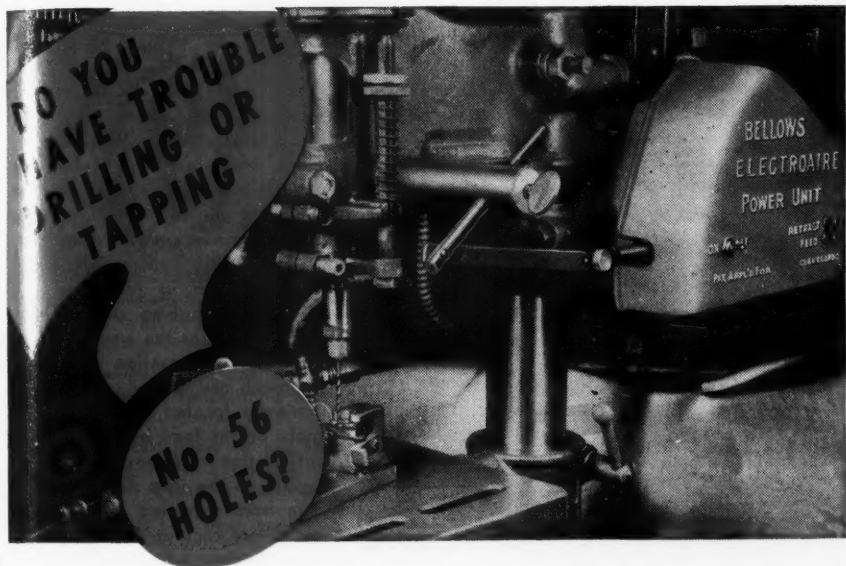
The Heald Model 322 Bore-Matic shown herewith features exceptionally fast table traverse. No swinging latches are used, therefore there is no danger of a latch hanging up and allowing the table to run by and cause an accident. V-belt life has been increased many times by the use of large idlers. All tools are the same hand. Reverse dog and positive stop are adjusted as one. The table traverse is exceptionally fast and accelerate while the table is traversing. A hand control releases the brake when adjusting tools. The improved hydraulic system circulates only the amount of oil needed, keeping it at an exceptionally low tempera-

ture. The oil is not in contact with the base, which further reduces distortion. All new Bore-Matics are equipped for two-way boring with different feeds in the two directions, if desired.



Fastermatic automatic turret lathes, as manufactured by Gisholt Machine Co., Madison, Wis., featured one of the new design 4F-size machines equipped with a 28-inch Gisholt 3-jaw air chuck and 18-inch air cylinder, machining a massive brake drum wheel hub casting. This new 4F Fastermatic is the most powerful machine of its type ever developed to handle heavy chucking work.





ELECTROAIRE POWER FEED

Is Cutting Spoilage and Tool Breakage Almost in Half

IF YOU drill, ream, or tap small holes the Bellows Electroaire Power Feed will help you obtain more production, with less tool breakage, and fewer work rejects.

At the touch of a foot pedal the Bellows Electroaire Power Feed advances the tool through the work with perfectly balanced feeding pressure. In drilling, the feed automatically slows at the "break through", preventing "hogging" and drill breakage. Individual speed controls permit unlimited variation of feed and retraction speeds. In tapping, the tap can be made to al-

most "float" out with no strain on the thread angle.

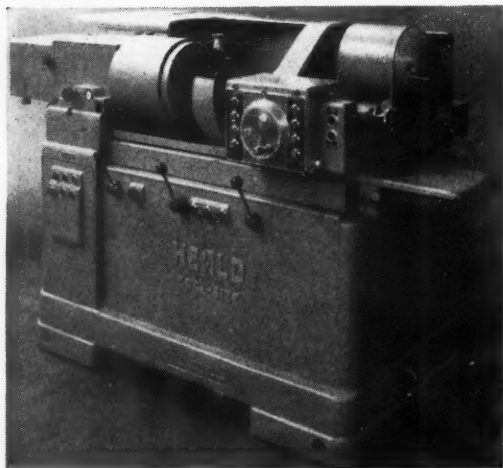
The Bellows Electroaire is enabling even comparatively inexperienced operators to produce precision work hour after hour with minimum physical effort—and with less than half the tool breakage, less than half the expected rejects.

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Write today for our new free Foto Facts File filled with photographs, drawings, production facts showing how you, too, can cut production costs with Bellows "Controlled-Air" Power Devices.

The Bellows Co.
ESTABLISHED 1911
AKRON, OHIO

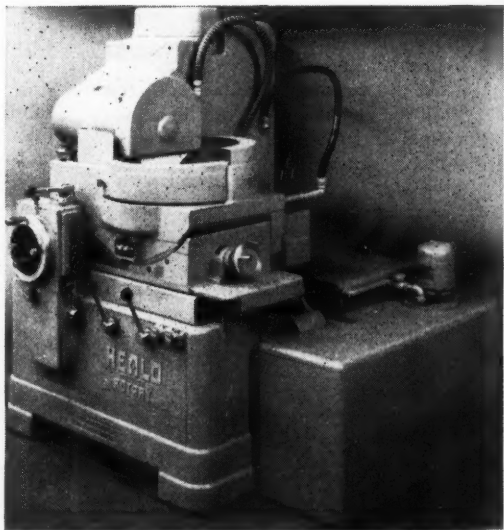
New Machines Presented At the Machine Tool Show



This Heald Model 271 Internal Grinder, manufactured by The Heald Machine Co., Worcester 6, Mass., features high frequency wheelheads, capable of running at very high speeds and taking heavy cuts. The new feed mechanism is arranged so that the roughing and finishing rates of feed and the amount of roughing and finishing feeds as well as the amount of retraction, compensation and rapid approach are set by turning conveniently located and graduated knobs on the feed box. Protected anti-friction ways provide maximum rigidity to the cross slide and freedom from cramping and sticking, and insure accurate feeds. An indicator shows when the belt ten-

sion is correct for the size of wheelhead used, avoiding excessive tension and insuring long life for wheelheads and belts. A new compact sealed wheel truing unit permits short wheel spindles and is free from external pressure which might disturb its accuracy. The diamond can be cooled by a jet of cutting fluid while truing.

Among the surface grinders exhibited by The Heald Machine Co., Worcester 6, Mass., at the Machine Tool Show was this Model 261 Surface Grinder. The wheel spindle of this surface grinder is mounted on a column, and the chuck table rests solidly on the ways of the base. The chuck is belt driven with no gears which might affect the finish and, as in all new Heald machines, the motor and pump are mounted off the machine where they will not transmit vibration or heat. These machines can be furnished with automatic grinding cycle. The vertical slide carrying the wheel is mounted in protected anti-friction bearings for rigidity and accurate feeding. The chuck has a variable speed drive, using a hydraulic motor.



HEAT TREAT

SMALL PARTS, TOOLS & DIES

In Your Own Plant

- Install anywhere by simple wire connection. Quiet in operation. No fumes or odors — no ventilating required.
- Any intelligent man can operate furnace with automatic temperature control, using established procedures.
- Operating cost under 4¢ per hour to hold 1600° F. in Model 3 furnaces, with 2¢ per kw.-hr. rate. Others in proportion.

NOW YOU CAN heat treat, harden and temper small parts in your own plant . . . without experienced heat treaters. Economical to install and use, Cooley Electric Furnaces operate efficiently at high or low heats, and save your large furnace time for work requiring large volume capacity. Here are some profitable uses:

PRODUCTION HEAT TREATING of small parts . . . Small batches . . . Running pilot lots to pre-determine mass production techniques . . . Emergency repairs . . . Industrial and laboratory testing . . . Miscellaneous controlled heating jobs.



CHAMBER	8"W 6"H 14"L	10"W 6"H 18"L	8"W 6"H 14"L
FROM COLD	1850° F. in 55-65 min.	1850° F. in 55-65 min.	2000° F. in 2½ hrs.
AMPERES	14.8 at 230 v.	19.6 at 230 v.	20.2 at 230 v.
WATTS	3400	4500	4650
MODEL*	MH-3 VH-3 MK-3 VK-3	MH-4 VH-4 MK-4 VK-4	VK-5
PRICE	160.00 185.00 200.00 225.00	245.00 270.00 285.00 310.00	340.00

* M models complete with hinged door and hearth plate.

V models have counterweighted vertical lift door.

K models include Selective Power Modifier for input control to correct temperature lag.

ACCESSORY EQUIPMENT

Electronic operated Veri-Tron indicating and controlling pyrometer, with thermocouple and lead wire . . . \$143.00
Same in self-contained, enclosed panel including line switch and fuses, with steel stand—completely wired . . . 250.00
Steel stand with shelf . . . 35.00

DEALERS AND DISTRIBUTORS WANTED!

Good territories open on this extensive line of self-contained small electric furnaces. Investigate now.

FORCED CIRCULATION AIR DRAW FURNACES — Write for data.

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NEW CATALOG completely describes all models and applications for each. Write today for your copy . . . no obligation.



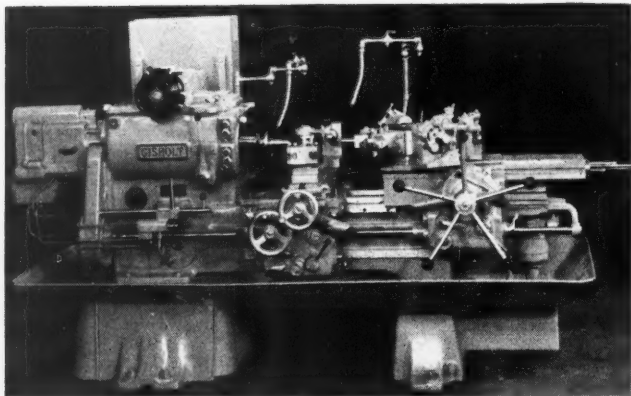
COOLEY ELECTRIC MANUFACTURING CORP.

34 South Shelby Street Indianapolis 7, Indiana

INDIANAPOLIS MACHINERY EXPORT CORP.

Export Manager, 44 Whitehall Street, New York, New York

New Machines Presented At the Machine Tool Show

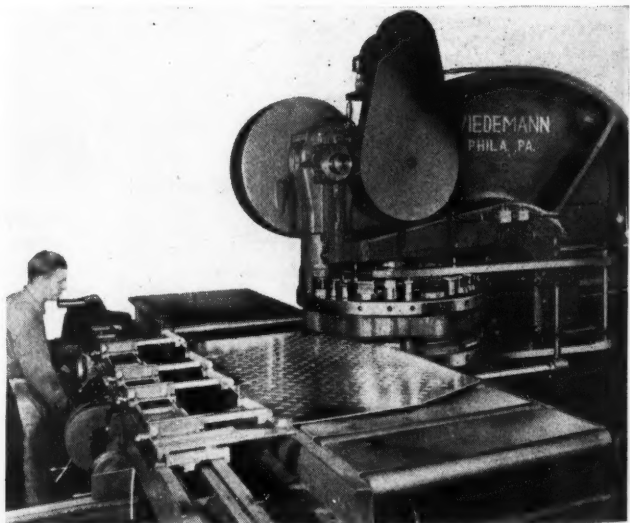


The Gisholt No. 5 Ram Type Turret Lathe illustrated herewith was shown turning three diameters and shaving a taper on an axle shaft employing standard Gisholt roll-type single cutter turners (box tools). At the completion of these cuts, and with the spindle at rest, a cotter key hole is drilled by an air-powered drill on

the rear of the cross slide, the drill being arranged to start and stop automatically with in and out movement of the cross slide. For drilling, the piece is supported by a Gisholt drill jig, built in combination with the stock stop used previously, with a pivoted interchange.



The latest in Wiedemann Turret Punch Presses were shown by Wiedemann Machine Co., Philadelphia 32, Pa., making short-run piercing operations. Included were a Wiedemann Type R-7 Turret Punch Press with gauge table which will pierce different-shaped holes (up to 6 inches square) in sheets up to 60 inches by 120 inches by $\frac{1}{4}$ inch; a Wiedemann Type R-41P Turret Punch Press which will pierce a variety of sheets up to 24 inches by 48 inches; a Wiedemann Type R-44 Turret Punch Press for accurate piercing through templates; and a Wiedemann Type R-2 hand operated turret punch press which will produce different shaped holes in a variety of small work.

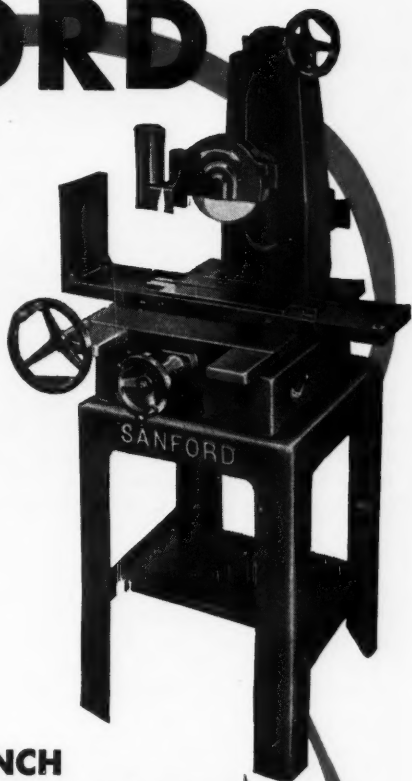


SANFORD

SURFACE GRINDERS

Model MG

Handles many odd size tool room and production jobs, due to its capacity of 8" x 12" x 12". Actual movements — Transverse 8 $\frac{3}{4}$ " — Longitudinal 13" — Vertical 12" (under 7" wheel).

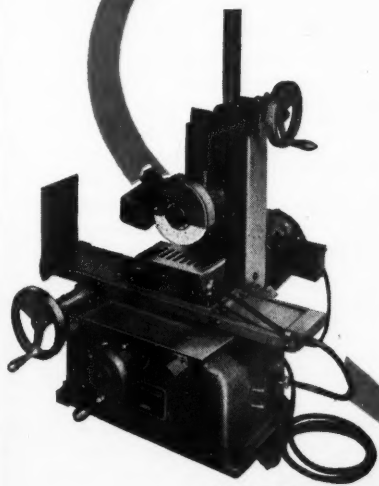


BENCH SURFACE GRINDER

Model SG

A sensitive, highly accurate machine specially designed "for the job that fits in your palm."

Actual movements — Transverse 4" — Longitudinal 8" — Vertical 6" (under 4" wheel).



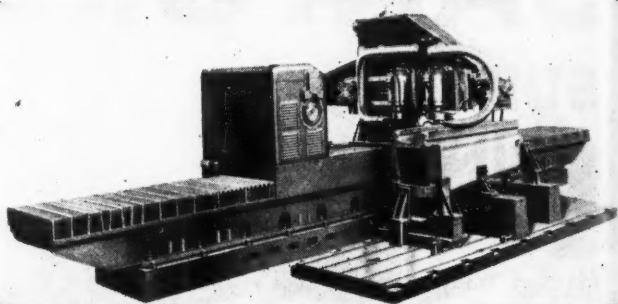
WRITE FOR COMPLETE DETAILS

SANFORD MANUFACTURING CO.
1021 COMMERCE AVENUE
UNION, NEW JERSEY

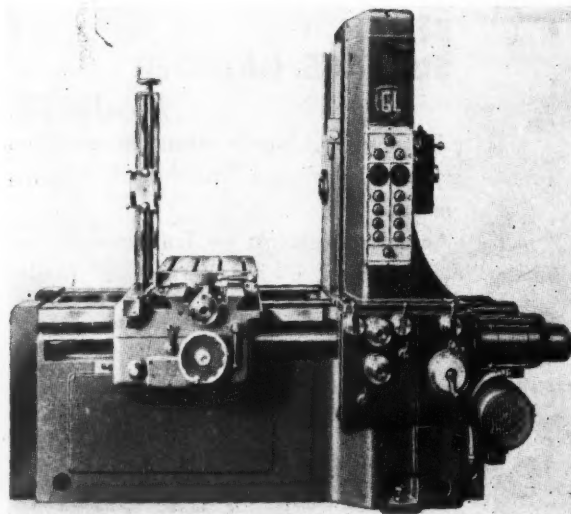
New Machines Presented At the Machine Tool Show

A new Giddings & Lewis Precision Way Grinder was unveiled at the Machine Tool Show by Giddings & Lewis Machine Tool Co., Fond du Lac, Wis. This precision way grinder promises to set a new standard for ground surfaces. The grinder develops

surfaces of a flatness varying by only a few ten-thousandths of an inch over a length of 30 ft. and more, with superior finish. Designed to minimize the human element in producing flat bearing and sliding surfaces, it speeds production of ways, gibs and other parts which formerly depended on the hand scraper for accuracy. Precision grinding may be done at any angle required for V-ways, dovetail slides, vertical surfaces and flat ways.



The Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., exhibited a table type Model 00-T horizontal boring, drilling and milling machine. The machine is designed to accommodate work up to 18 inches cube in size and 1000 lb. in weight. The machine meets exacting standards for finished dimensions in production milling and boring of small work. With the tracing



attachment, it is used effectively for die sinking work such as plastic and die casting molds, hammer forging dies, and so forth. It may be employed for precision thread cutting when equipped with a thread lead device. In addition, it will efficiently handle a wide range of small-lot work requiring a high degree of accuracy, but where the expense of jigs and fixtures is not justified. Driving gears on the spindle provide a substantial flywheel effect. This is of particular importance when milling with carbide tipped cutters, assuring a smooth-running spindle. All machine movements are regulated by electronic and mechanical controls in a convenient centralized panel.

MEMO

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RUSNOK has every
feature we need
for our milling
requirements.
Let's write for
their free illustrated
circular. J.D.P.

- Precision built for the heavier duty operations
- Heavy duty — easily handles maximum capacity—1/16"—3/4" end mills
- Six speeds—six splined pulley drive—timken tapered roller bearings
- Brackets to fit most milling machines—adaptable to many other types of machines
- Utilizes an unlimited variety of cutters
- For vertical, horizontal and angular operations
- 4" quill travel—#9 B & S spindle taper

Write for illustrated circular

prompt delivery



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RUSNOK

ATTACHMENT

MILLING • DRILLING • BORING

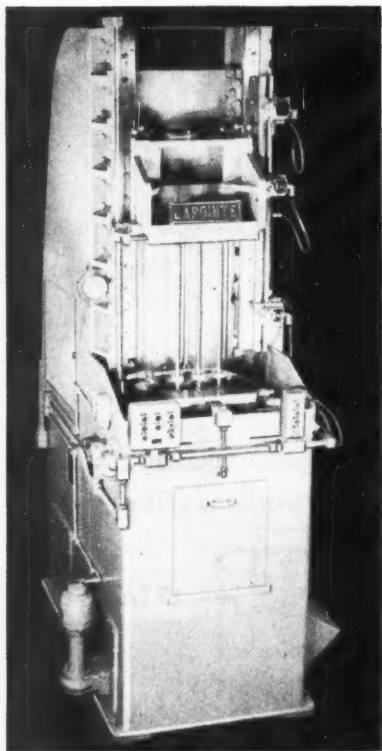
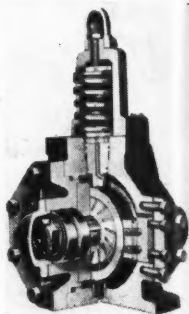
RUSNOK TOOL WORKS • 4840 W. NORTH AVENUE • CHICAGO 39, ILL.

November, 1947

MODERN MACHINE SHOP 235

New Machines Presented At the Machine Tool Show

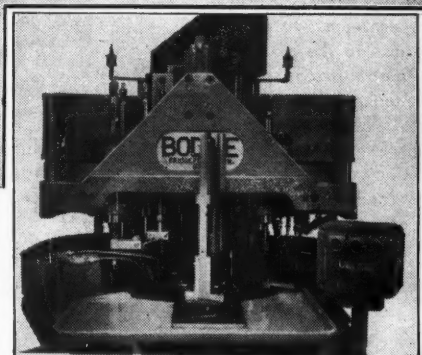
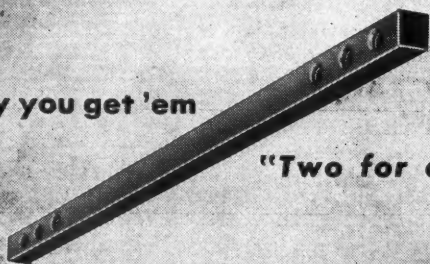
Racine Tool & Machine Co., Racine, Wis., included a full display of hydraulic pumps, valves, pressure boosters and controls, featuring Racine's "Variable Volume" Oil Hydraulic Pumps. Cut-away models of Racine's "Variable Volume" Pump, hydraulic pressure booster and solenoid controlled 4-way, sleeve type, balanced piston valve were on display. Of particular interest was the new, high pressure vane type, adjustable volume hydraulic pump shown herewith. This is an exceptionally compact unit measuring 6 inches by 6 inches overall. It is designed to be engineered into small spaces on equipment where a highly efficient high pressure hydraulic pumping unit is required.



At the Machine Tool Show the Lapointe Machine Tool Co., Hudson, Mass., exhibited six of the latest and most widely-used type broaching machines in industry. The display consisted of two large and two small vertical broaching machines, and one large and one small horizontal broaching machine. The machines were as follows: Model HP-5, 2½-ton 30-inch stroke horizontal hydraulic pull, Model F. P. C. 2½-ton 18-inch stroke vertical hydraulic push, Model DRV 5-ton 54-inch stroke double ram vertical hydraulic surface, Model HP-15, 7½-ton 48-inch stroke horizontal hydraulic pull, Model SRV 15-ton 66-inch stroke single ram vertical hydraulic surface, and Model V-3 special 20-ton 42-inch stroke vertical hydraulic pull down. For the purpose of demonstration, the six machines were tooled to produce various contours, grooves, slots, and holes in a wide variety of parts, such as lock cylinder barrels, safety razor caps, wrench handles, rifle barrels, jet engine compressor wheels, and different sized automobile clutch hubs. The Lapointe display also featured a complete line of broaches ranging in size from 0.042 diameter to 8 inches.

Here's why you get 'em

"Two for a nickel"



At the Machine Tool Show this Bodine Model 42-30 Automatic Drilling and Tapping Machine demonstrated its speed as follows:

Drilled and tapped six 10-24 holes in a 1/4" square steel Lock Spindle at the rate of 800 completed pieces per 50-minute hour . . . (9600 operations). There are 6 drilling and 6 tapping spindles to which the work is indexed on a horizontal dial. All operations are completely automatic, including the magazine feed and ejection.

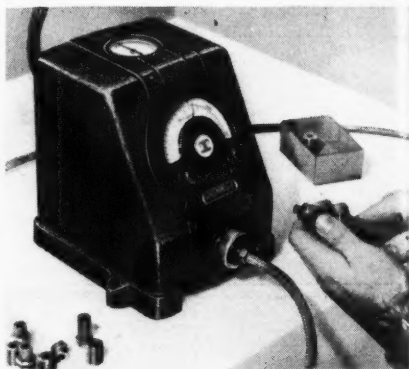
This machine and your product can become the best of friends . . . working harmoniously with your production schedules . . . profitably with the cost sheets. Send us a sample part and blueprints for practical recommendations. Maybe you can get 'em two for a nickel!

THE
Bodine
CORPORATION
BRIDGEPORT, CONNECTICUT

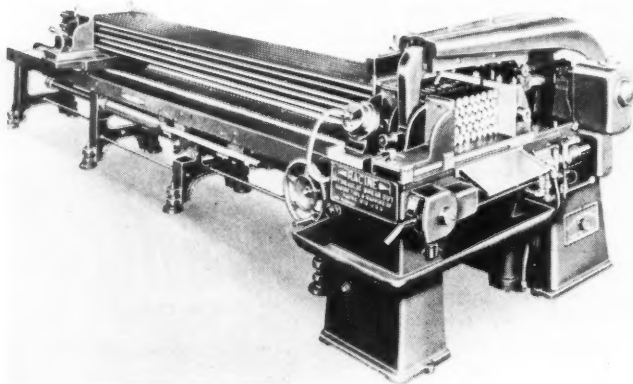
AUTOMATIC DIAL TYPE DRILLING, MILLING,
TAPPING, AND SCREW INSERTING MACHINES

New Machines Presented At the Machine Tool Show

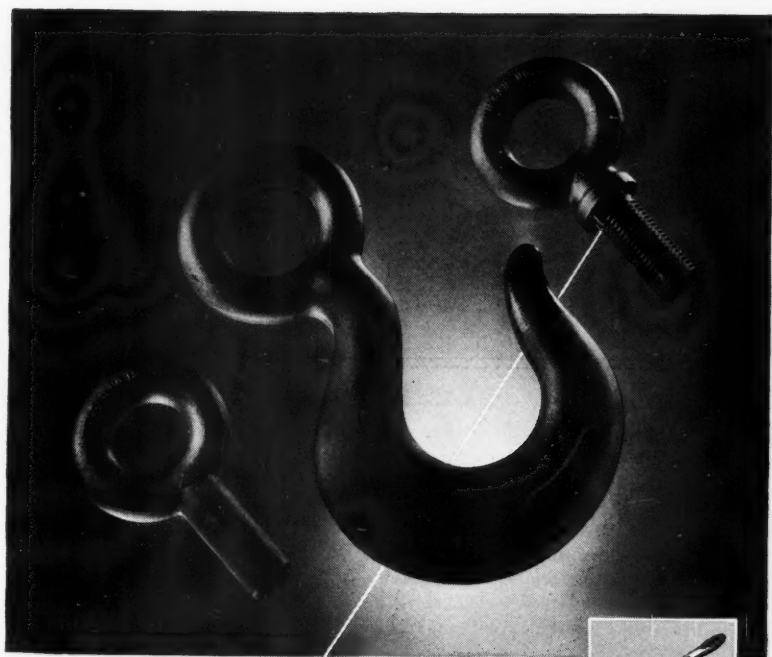
From the Gage Division of The Taft-Peirce Manufacturing Co., Woonsocket, R. I., came a modern, streamlined air gage which is only 7 inches wide, 8½ inches deep, 7½ inches high, and weighs only 12 lb., so that it can be easily moved to the job for spot-checking. In fact, it is designed to make possible faster and more economical inspection in the laboratory, at the bench, or at the machine. This new air gage, known as the Taft-Peirce CompAirator, is complete and self-contained. Housing contains filter and regulator. All the operator has to do is to attach the air supply hose to the air line. He needs no special skill to operate the gage, which measures without mechanical contact. He can check easily all dimensional variations such as taper, out-of-roundness, bell-mouth and barrel-shape conditions. The Taft-Peirce CompAirator combines the two advantages of a diaphragm-actuated dial indicator (high sensitivity and easy readability) with the fast action of a velocity-type air circuit. This indicator provides accurate readings, free of pointer-flutter. It is a 180 deg. linear dial, graduated in 0.00005 inch increments.



Racine Tool & Machine Co., Racine, Wis., exhibited a full line of single purpose and production type metal cutting machines at the Machine Tool Show. Included among the single purpose machines were utility type dry cut machines, 6-inch by 6-inch wet cut machines and larger capacity production type units equipped to demonstrate actual cutting-off work. The feature of this company's display was a new 10-inch by 10-inch capacity general



purpose utility type machine, incorporating new and interesting feeding and cutting principles. Actual cutting-off work was handled on this new equipment demonstrating its versatility in the handling of every range of material from solid bar stock to tubing, channel iron and various formed shapes.



Specify "Vulcan"

FOR SAFE PERFORMANCE

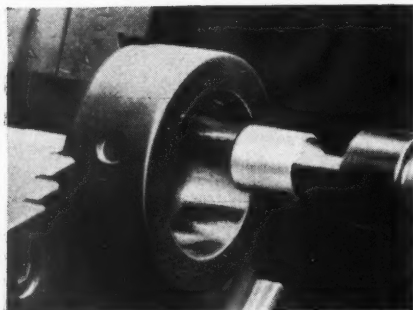
Not only are Williams "Vulcan" Hoist Hooks and Eye Bolts drop-forged from selected steel and specially heat-treated to provide maximum strength and toughness, but every "Vulcan" is individually proof-tested to 50% beyond its rated "safe working load." Each item so tested is stamped with a certifying mark. All guesswork is eliminated when you specify Williams "Vulcan" Hoist Hooks or Eye Bolts.

You can identify "Vulcan" Hooks by their orange tip. Sold by leading Industrial Distributors everywhere. J. H. Williams & Co., Buffalo 7, N. Y.

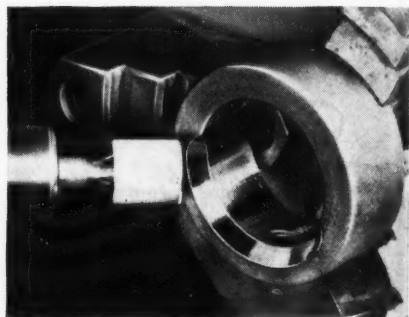
WILLIAMS
DROP-FORGINGS AND
DROP-FORGED TOOLS



New Machines Presented At the Machine Tool Show



ently known means. Tube deburring cutters were demonstrated removing cut-off burrs from inside and outside in one operation, with many variations. Chatterless countersinks were operated in a drill press to show seats of superior finish, answering to specifications common to valve seats. Drill-reamers were used to drill and ream holes to close tolerances in a single pass. The main demonstration featured Severance Micro-Mills performing various operations encountered in internal grinding. While removing measurable chips at speeds common to milling, they produce finishes comparable to grinding or honing with less heat generation and minus the frequent interruptions for wheel-dressing so annoying with grinding wheels.



Severance Tool Industries, Inc., Saginaw, Mich., presented both display and operating exhibits at the Machine Tool Show. The exhibit included a demonstration of the operation of carbide midjet mills on both soft and hard materials. Powered with a Precise-40 operated at 40,000 r.p.m., these mills made cuts not possible by grinding or other pres-

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RAWHIDE is tops for 'soft' mallets and hammers. And you can't beat *Chicago Rawhide*. Tightly coiled, specially treated C/R surfaces won't split, crumble or mushroom. They absorb shock, deliver powerful blows, protect delicate surfaces, and stand up under tough use. Always ask for *Chicago Rawhide*.



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Other C/R maintenance products are: round, flat and twist belting; belt pins and belt lacings; gears, pinions and gear blanks; aprons and hand leathers; hydraulic packings.

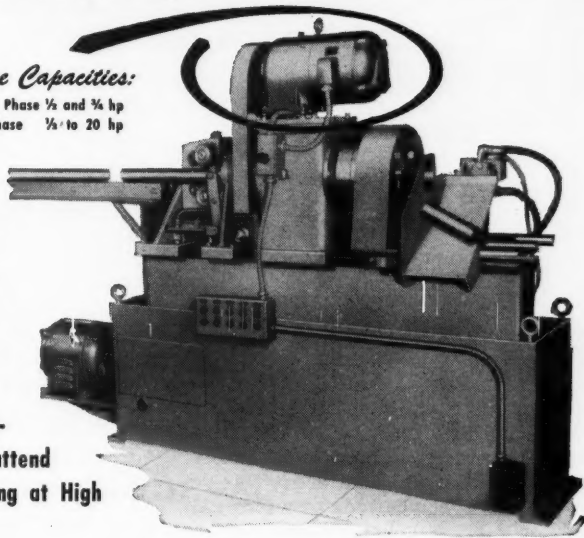
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PINES ENGINEERING COMPANY, INC.
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Drive Capacities:

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Polyphase $\frac{1}{4}$ to 20 hp

The new PINES Full Automatic Rotary Cut-Off Machine, developed to complete the line of PINES tube working equipment is truly automatic. Hydraulically operated and with power driven conveyor, one operator can attend several machines operating at High Production Speeds.



To maintain proper cutting speeds for tubes from $\frac{1}{2}$ " O.D. to $2\frac{7}{8}$ " O.D., PINES chose LIMA multi-speed Gearshift Drives to be used as an integral part of this new machine to control cut-off operations.

If you manufacture machinery requiring selective speeds, let us tell you how LIMA multi-speed Gearshift Drives can be integrally adapted to your product. There is no charge for consulting services. Write us today.

THE LIMA ELECTRIC MOTOR CO.

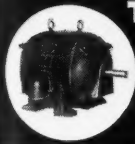
162 FINDLAY ROAD

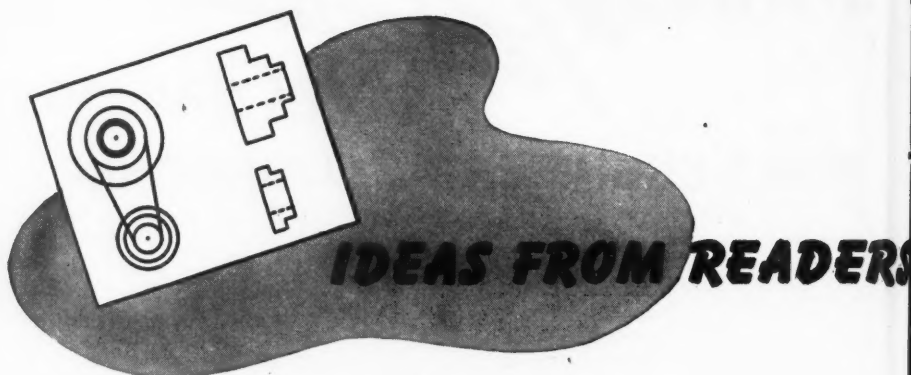
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LIMA GEARSHIFT DRIVES

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Sphere Turning to Close Limits

By WILLIAM E. WELCH

PRECISION turning of small metal spheres to close limits of accuracy often necessitates on-the-spot improvisation of equipment to handle the job. Such was the case at the U. S. Navy Electronics Laboratory, San Diego, California, when an order was received the specifications of which called for a brass sphere to be 6 inches in diameter with a total deviation from "round" of plus or minus 0.0005 inch. Inasmuch as the sphere was to be used in under-water sound research, it had to have a nonporous surface with a mirror polish and be equipped

for suspension under water.

A brass casting of a sphere was made, cast $\frac{1}{2}$ inch over-size to allow for turning and polishing, and with a stud approximately 3 inches long and $1\frac{1}{4}$ inches in diameter projecting at right angles from the side. The casting was chucked in a lathe and the stud was rough-turned, in the process of which the side of the casting from which the stud projected was also turned and faced back to about one-fourth of the original diameter as shown at **A** in the drawing Fig. 1. The stud, indicated at **B**, was then finish-turned to 1 inch in diameter and threaded as shown.

To supply the missing quarter of the sphere, a brass section was rough-turned from a piece of brass stock, faced flat on one side and turned on the other to the same radius as the sphere. This quarter-section **C**, was then drilled, bored and tapped through dead

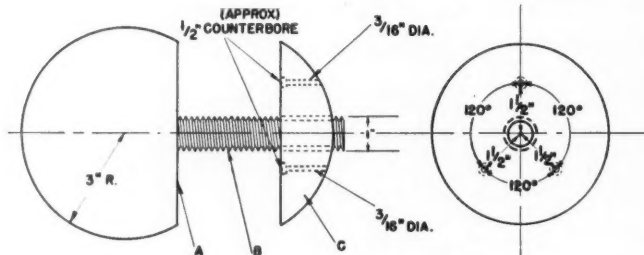
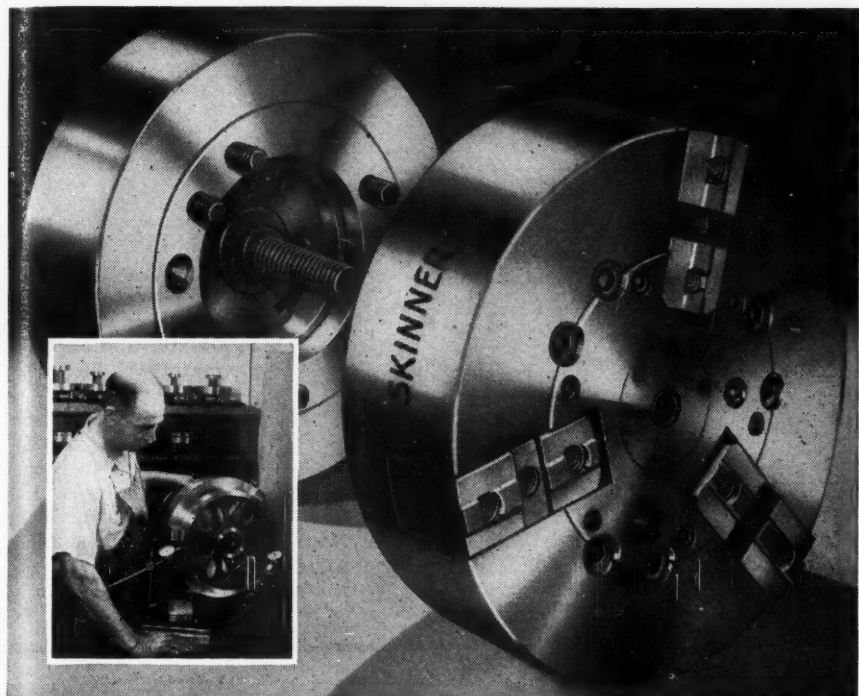


Fig. 1—Drawing illustrating method of machining sphere.



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And that's not all, Mr. Jones. There are other features of Skinner Power Chucks about which you ought to know. Take a look at their rugged construction — balanced, forged-steel bodies, ma-

chined all over, provided with wide jaw ribs to keep jaws properly aligned and in the same plane — every part, plus the assembled unit, checked and rechecked. There are years of productive service in every Skinner Chuck. Safety is important, too; that's why Skinner has paid special attention to the wedge-angle. *Once the jaws grip a piece in any position, they will not release even if the air supply is completely cut off!*

Power chucking is a modern time-saving method that offers a simple way to greatly reduce your production costs. Skinner offers a complete line of self-centering and combination power chucks and

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Fig. 2—With the parts assembled, the sphere was mounted in a collet chuck on a milling machine.

center to fit the thread on the stud. In addition, three $\frac{3}{16}$ -inch holes were drilled parallel with the axis, 120 de-

grees apart and $1\frac{1}{2}$ inches from center, as shown. These holes were counter-bored $\frac{1}{2}$ inch in diameter and approximately $\frac{1}{2}$ inch deep on the flat side of the piece to accommodate knots on the ends of $\frac{3}{16}$ -inch suspension cables which, inserted through the

sphere under water.

With the holes drilled and the flat

ACRO-GRIP

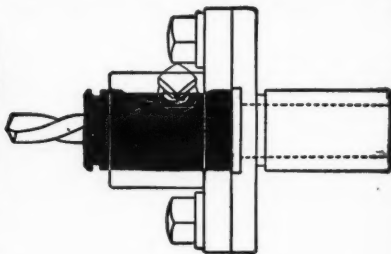
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Set No.	Holder Number	Bushing Size		Range of Set in 64ths	No. of Pieces	Net Price with Case
		Dia.	Length			
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SB-105	11A 20 BA	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{1}{8}$ to $\frac{7}{8}$	25	\$31.00
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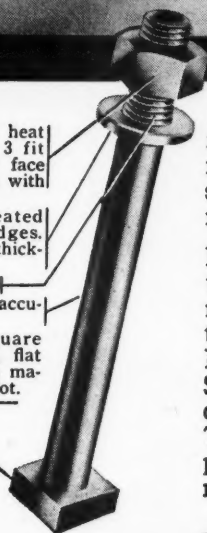
NUT of alloy steel, heat treated with Class 3 fit thread, and washer face commercially square with threads.

WASHER heat treated steel, chamfered edges. Ground to uniform thickness and hardened.

THREADS Class 3 fit.

SHANK ground for accuracy.

HEAD Machined square with shank. Square, flat surface of head fits machined surface of T-slot.

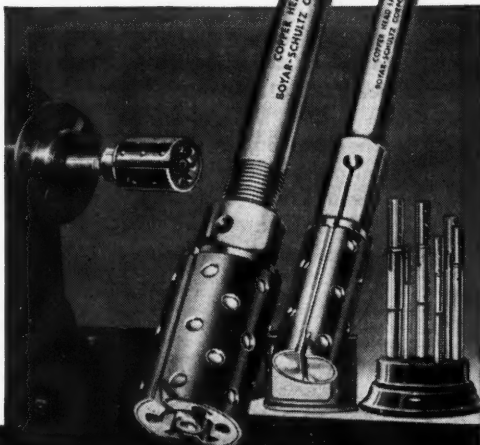


It is cheaper to use precision made bolts than to repair expensive machines. Poorly made bolts of soft steels can quickly ruin the accuracy of a machine.

Boyar-Schultz S. M. B. Bolts are made to protect the T-Slot. They are precision made from upset alloy steel forgings and threaded for a Class 3 fit. Use S. M. B. Nuts and Washers with S. M. B. Bolts for firm, delicate adjustments. They hold work in exact position for heaviest machine cuts.

BOYAR-SCHULTZ Copper Head Laps

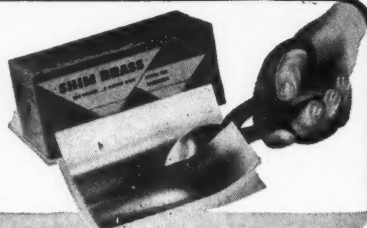
Economy and accuracy are the outstanding features of Copper Head Laps. They work rapidly. Only the replaceable copper sleeves wear out. Sleeve adjustment permits maintaining correct lapping size till worn out when it is replaced with a new one. Save costly tool room time. Available from stock in standard sizes, $\frac{1}{8}$ " to $2\frac{1}{2}$ " Diameters.



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side of the quarter-section smoothly finished, the section was threaded on to the stud and drawn tight against the flat side of the sphere. The parting line is discernable as a thin line in the photograph Fig. 3. Thus assembled, the sphere was mounted, by means of the stud, in the collet chuck of a milling machine as shown in the illustration Fig. 2.



Fig. 3—The indicator showed that the sphere was within 0.0002 inch of perfection.

To obtain accurate positioning of the cutting tool and to preserve a uniform depth of cut over the entire sphere, a special turntable assembly was rigged on the bed of the machine. On a flat steel plate was mounted a turntable driven through a 900:1 gear train, power being supplied by a fractional-horsepower motor. The turntable carried a standard lathe compound rest and toolpost in which was mounted a

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You can produce a full bearing surface in any hole—in steel, cast iron, bronze, aluminum, carbides, ceramics, plastic, or glass—with a guaranteed accuracy of .0001". A complete line of abrasives is available to produce any degree of surface finish desired.

The Sunnen Precision Honing Machine provides real savings in long run production costs, and even greater savings on job lots and short runs when frequent size changes are necessary.

For PRODUCTION Work... Duplicates sizes quickly and accurately. Saves time. Often replaces preceding grinding and reaming operations with greater accuracy and lower total cost per piece. Straightens holes with minimum stock removal. Corrects heat-treat distortion. Removes burrs and flash from drilled, machined or punched parts.

For PRECISION Honing... Is being used to hold tolerances as close as .000025" and to produce down to 2 micro-inch finish in hardened steel. Hones perfectly straight round holes, free from bell-mouth and taper. Many times faster than lapping, at much lower cost.



In addition, the Sunnen Precision Honing Machine is easily set up. Often on short runs the job can be completed faster than set-up can be made on other machines. No jigs or fixtures are required.

Find out how Sunnen Honing can help you save time and reduce costs. Call in a Sunnen engineer or write for bulletin giving complete information.

Typical Examples



Two lands, $\frac{1}{8}$ " long, honed in perfect alignment.



Smooth surfaces provide long life for washing machine parts.



Smooth finish and close tolerance easily held on $1\frac{1}{4}$ " hole in steel vibrator body.



Tolerance, .0002", finish of 10 micro-inches produced on these sewing machine parts.



Bell-mouth eliminated, production increased on these line reamer bushings.



SUNNEN PRODUCTS COMPANY

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257



Mo-Max high speed steel toolbit.

The turntable was positioned with the toolbit at a point near the shank of the assembly, then a $\frac{1}{8}$ -inch cut was started with the piece revolving at a speed of 700 r.p.m., the table rotating at a rate of 2 revolutions per hour. The cut was continued through approximately 175 degrees.

At the conclusion of each cut the bit was backed away from the work, returned manually to the starting point, and the process was repeated. As successive cuts were taken the speed and depth of cut were gradually reduced, the finishing cuts being taken at speeds of 500 r.p.m. with the tool removing 0.002 to 0.005 inch per cut.

When the sphere had been finished to the required diameter, a steel roller was substituted for the toolbit and the surface was rolled to close the pores of the metal. A final polishing with rouge, producing a mirror finish, completed the job. Inspection showed that

the periphery was true and accurate to 0.0002 inch, nor did it vary more than that much from the required 6-inch diameter—well within the specified limits.

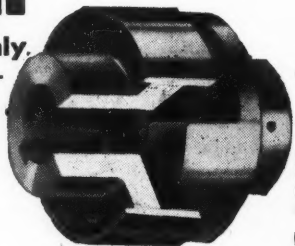
Milling Coiled Stock

By JOHN E. HYLER

DURING my visits to various plants, I have noted with particular interest a variety of methods employed in working coiled stock, whether it be wire, tubing, strip, rod, or some special form material. I have seen coiled stock fed by means of special feeding devices to presses, multi-slide machines, straightening and cutting-off machines, and so on. Interesting as these methods are, none of them intrigued me quite as much as a special automatic, motor-driven, continuous milling fixture which I witnessed in

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flows more smoothly
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From 1/6 to 2,500 h.p. All types and sizes. Cushion material for any requirement.

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"We Save up to 30% of Production Time WITH WALKER-TURNER DRILL HEADS IN SPECIAL JIGS" . . . Wright Aeronautical Corp.

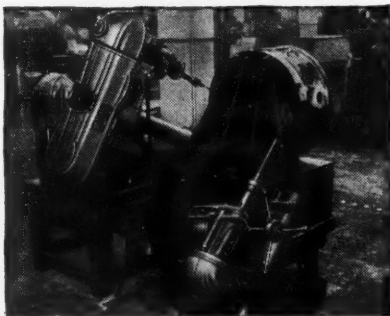
"To eliminate costly setup time, a number of small individual jig-drill combinations employing Walker-Turner standard drill units costing \$100 to \$400 have been installed.

"Housing sections of the Wright Cyclone engine require hundreds of holes of various depths, diameters and angles. With this installation the changing of jigs and fixtures becomes unnecessary.

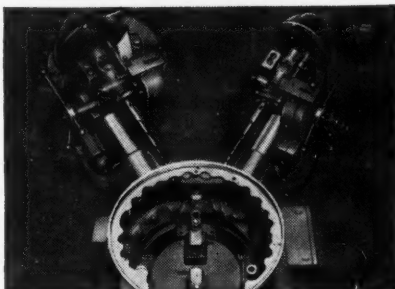
"PRODUCTION SCHEDULES ALLOWED AS MUCH AS 30% OF TOTAL OPERATION TIME FOR THIS SETUP PROCEDURE. This new method eliminates setup and the possibility of error is reduced.

"We now have more than 30 special jig-drill setups employing Walker-Turner Drill Heads in this plant all working to our complete satisfaction."

E. PRANGE, Supervisor
Process Engineering
Wright Aeronautical Corp.



Operating on the bottom of the workpiece, two Walker-Turner 20" Power Feed Drill Presses are used in this installation.



By placing two Walker-Turner 20" Power Feed Drill Heads in a horizontal position, loading of the cumbersome workpiece is greatly facilitated.

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Fig. 1—Horizontal Milling Machine Equipped with Special Fixture for Continuously Milling Form in Coiled Stock
(Illustration Courtesy U. S. Tool Company)

operation recently. The fixture was specially designed by U. S. Tool Company for continuous feeding of coiled stock to a milling machine in order that it may be continuously milled.

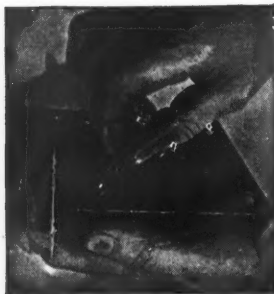
The accompanying illustration Fig. 1 shows a view of a U. S. Tool Company horizontal milling machine

equipped with power-driven, feed-in and take-out rolls, to feed the stock continuously under the cutter during the milling operation. The rolls are form-ground to correspond to the contour of the design that is to be milled in the continuous strip.

Two examples of designs which can be milled continuously in the strip are illustrated in the drawings Fig. 2. Follow-

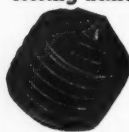
ing the milling operation, the milled strip can be cut in lengths to suit the requirements of a particular job.

While milling operations of this kind may not find extensive application, there are certain cases where the cost of milling form stock in this manner is considerably less than the cost



A REAL HELPING HAND

It's a help that die makers, tool makers, machinery builders and general machinists have long sought—a more accurate and surprisingly faster way of transferring blind screw holes.



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A complete line of Procunier High Speed Tapping Heads is available, including heads to fit most makes and sizes of drill presses.

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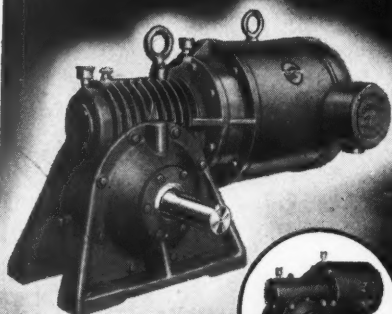
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of stock drawn to shape. The type of finish required and promptness of delivery are factors to be considered in this connection as well as the fact that where this method is used no investment in an inventory of expensive drawn stock is required.

When the continuous milling fixture is removed from the machine, the lat-

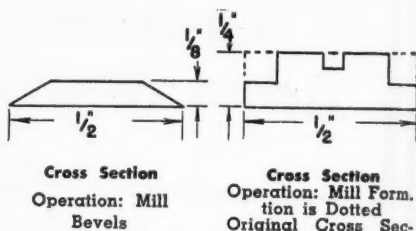


Fig. 2—Drawings Illustrating Designs Milled in Coiled Stock

ter becomes a standard milling machine suitable for any other application that might logically be expected of it.

Handy Measuring Tool

By D. E. McDONALD

THE following description explains the construction and use of a simple measuring device designed for making measurements similar to those made with vernier calipers. As shown in the accompanying illustration, the device consists primarily of two micrometer parts—one carrying the anvil (1) and the other carrying the spindle (2)—mounted on a steel scale (3). A slot is machined in the base of each part to receive the scale. Each part is then drilled and threaded to receive locking screws (4) and (5). This type of locking screw is similar in construction to that of the ordinary screw used on combination squares in

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YOU CAN save money and get better results on many jobs by using this DIAMO-CARBO dresser in place of diamond tools or common Huntington dressers. For instance, in forming special shaped wheels, turning delicate edges or turning all wheels up to "hard" grade, the DIAMO-CARBO is tops. Its long steel tube is packed with an extremely hard abrasive. You keep the tube ground back about $\frac{3}{8}$ th inch from the abrasive, support it on a tool rest and roll it back and forth lightly across the wheel face.

Only Desmond makes the DIAMO-CARBO dresser, and only Desmond makes a complete line of dressing tools. So, whatever your requirements, ask your distributor for Desmond dressers by name and be sure of getting the right tool for the job.

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Let this display (found at most Mill Supply Distributors) remind you to **SAVE** on grinding costs with Desmond Dressers and Cutters.

***Patented**

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DRESSERS & CUTTERS



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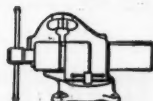
**REVOLVING
CUTTER TYPE DRESSERS**



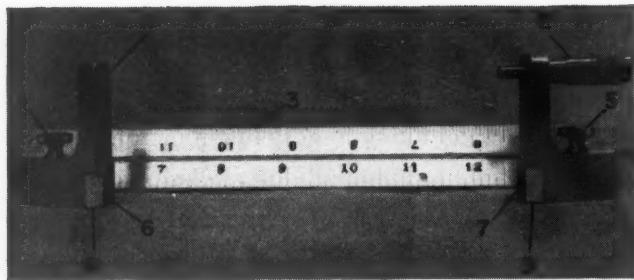
**DIAMOND HAND TOOLS
AND NIBS**



**WHEEL TYPE
DRESSERS**



**SIMPLEX
STEEL-SLIDE VISES**



Handy Measuring Tool

anvil and the end of the micrometer spindle are touched up with a thin, fine grinding wheel to make these two

which a tongue at the end of the screw engages the groove which extends lengthwise of the scale. Tightening the screw by means of the knurled head causes the tongue to bind in the groove, thus locking the micrometer frame to the scale. After the two micrometer frames have been mounted on the steel scale, a steel gageblock 0.500 inch thick is placed between points (6) and (7). With this steel block securely in position between points (6) and (7), the face of the

faces absolutely parallel with each other. The grinding operation also provides the means for making any necessary correction to the two faces in order that they may be in direct contact when the micrometer is set at 0-0.

If the range of the micrometer is $\frac{1}{2}$ inch and it is desired to obtain a close measurement of greater dimension, precision gage blocks can be placed between points (6) and (7) in order to provide the proper setting

A Necessity

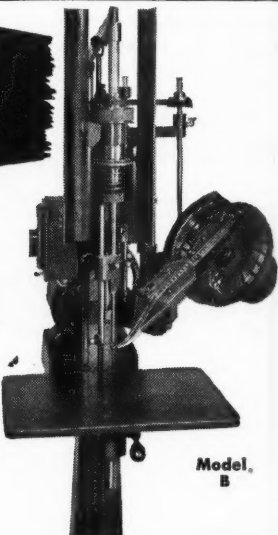
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Production Assemblies

Years have proved the indispensability of these husky, sensitive hopper-fed machines in keeping pace with modern production.

3 Models to drive screws from No. 2 to $\frac{5}{8}$. Model B pictured drives screws from No. 6 to No. $\frac{1}{4}$. No marring of screw heads or stripping threads. All screws driven to uniform tension.

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Model B

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And that's FISKE DARL OIL. It is a base cutting oil that can be used straight or reduced, is non-corrosive, works on ferrous and non-ferrous metals, has visibility and exceptional anti-weld value. DARL is just as effective for drawing and stamping as it is for cutting. FISKE OILS are sold on a "results" basis. Write today.

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● When last minute changes come through on hardened parts and dies—drill without annealing using "HARDSTEEL" drills—and save time.

When parts must positively match at assembly—harden first, then drill with "HARDSTEEL" drills—and save time.

When case hardened steels must be drilled, use "HARDSTEEL" drills to get through the case—and save time.

Yes, "HARDSTEEL" drills, made of special material and to a special design eliminate all annealing and the distortion usually caused by rehardening. They work on steels hardened by any process to 40 Rockwell "C" or harder.

The "HARDSTEEL" Operators Manual will give you many tips on how this well known tool can save time and material in your plant. Copy free on request.

**You Harden It — We'll Drill It —
with "HARDSTEEL"**

**"HARDSTEEL" Tool bits make
faster, deeper cuts on steels
and non-ferrous alloys.**

BLACK DRILL CO., Division Black Industries
1390 East 222nd Street + Cleveland 17, Ohio

"HARDSTEEL"
DRILLS • TOOL BITS • SPECIALS

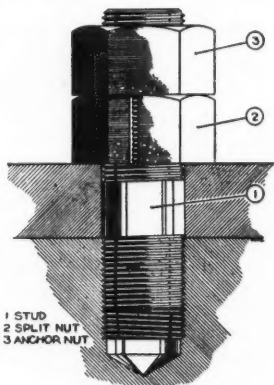
after which the gage blocks may be removed. As an example, suppose it is desired to obtain a dimension of $16.000 \text{ inch} \pm 0.001$. It will be necessary to place gage blocks between points (6) and (7) having an overall measurement of 16.500 inch . The additional 0.500 inch represents the micrometer travel when the micrometer has been set to 0-0. The distance between the two measuring points will be 16.000 inch .

The above method of setting in all probability would only be required once in a while. Therefore, the gage can be set by eye to obtain a measurement having an accuracy of $\pm 0.003 \text{ inch}$ by sighting along the chamfered surfaces (8) and (9), thus making the setting on the lines of the scale proper.

Stud Removing Simplified

(Courtesy General Electric Company)

MANY methods have been recommended for quickly and easily removing studs from workpieces, each



1 STUD
2 SPLIT NUT
3 ANCHOR NUT

Drawing Illustrating Method of Removing Studs

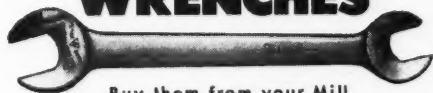
method being characterized by one or more good points. However, as each method is analyzed and tried, a work-




more and more
in wrenches
the name is

BILLINGS

WRENCHES



Buy them from your Mill
Supply or Hardware Dealer

THE BILLINGS & SPENCER CO.,  HARTFORD 1, CONNECTICUT, U. S. A.

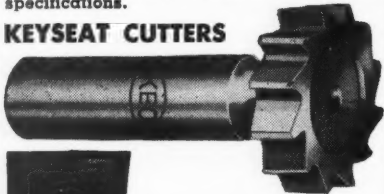
KEO

CENTER DRILLS



Made of finest high speed steel. Available in all standard sizes. Always in stock for immediate delivery. Specials made to your specifications.

KEYSEAT CUTTERS



High speed. Right hand. $\frac{1}{4}$ " shank. Diameters from $\frac{1}{4}$ " to $1\frac{1}{2}$ ". Standard sizes in stock for immediate delivery. Complete set—41 sizes—available in sturdy, hardwood box. Saves time and money, because you always have the size you need.

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High speed steel. Reamers from $\frac{1}{4}$ " to 1" regularly furnished with 60°, 82° or 90° included angle. Specials made to your specifications.

LATHE MANDRELS



Precision made of tool steel, hardened and accurately ground. Tapered .0005" to the inch. Mandrels from $\frac{3}{16}$ " to 1" are .0005" undersize at small end, from $1\frac{1}{16}$ " to 3", .001" undersize. Immediate delivery.

Write for Literature

Illustrated literature and prices on all KEO Products mailed on request.

KEO CUTTERS

19326 Woodward - Detroit 3 Mich.

man usually comes to the conclusion that removing studs by many of the methods recommended wastes time. In a search at General Electric's Erie Works for a quick method of removing studs, a simple procedure was developed which not only saves a considerable amount of time but also permits the stud to be removed without damage to the threads.

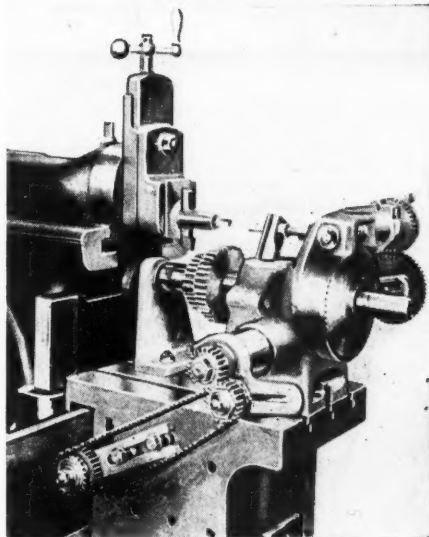
As shown in the accompanying illustration, two standard nuts — one slotted — are backed against each other. By means of a wrench, pressure is applied to the split nut thus causing it to bind against the stud threads. The solid nut serves as an anchor. With the two nuts in solid contact, the stud can easily be removed as though it were a standard bolt.

Bordjaw Chuck, a small-lathe precision chuck especially designed for maximum efficiency in using the bored-jaw method of holding work, is fully illustrated and described in a four-page bulletin prepared by the Edward Blake Co., 634 Commonwealth Ave., Newton Centre 59, Mass. A table of specifications and dimensional drawings are also included in the bulletin, copy of which is available free upon request.

Ex-Cell-O Precision Grinding Spindles. An 80-page easy-to-use catalog listing precision grinding spindles, spindle brackets, and quills and providing information on their application to new and old grinders is announced by the Ex-Cell-O-Corp., 1200 Oakman Blvd., Detroit 6, Mich. The index lists spindles by manufacturers of grinders for purchasers of replacement spindles, and also by type of spindle for designers of new machines. Drawings and charts present all pertinent dimensions; notes explain application to individual grinders. The catalog covers spindles for internal grinders, universal grinders, surface grinders, tool and cutter grinders, and special applications. Both belt-driven and inbuilt motor spindles are shown.

Copy of Catalog 25962 is available free to mechanical executives addressing requests on their company letterheads.

MATTERSON GEAR GENERATING ATTACHMENTS



for use on the
**SHAPING
MACHINE**

For Spur Gears up to
12 inch x 4 D.P.
as shown in
illustration on left.

For Bevel Gears 6 inch and
12 inch as shown on right.

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Agents wanted.*

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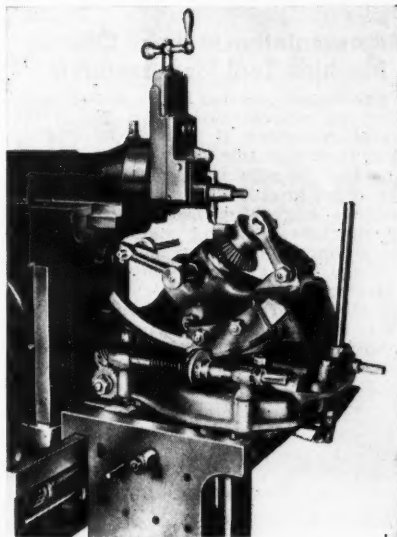
(Established 1919)

Greycoat Street,

Westminster, London, S. W. 1

**Cables: Accuratool,
London.**

**Codes used: Bentleys,
A.B.C. 5th and 6th edition**



News of the Industry

Small Presses May Now Be Leased

Paralleling the plan of leasing equipment, so common in many industries, Williams Equipment & Supply Company, 3016-8 E. McNichols Road, Detroit, Michigan, has set up a standard plan for leasing small punch presses. The plan makes it possible for the manufacturer to use his capital to maintain an inventory of raw and finished products and to carry accounts, rather than have it tied up in equipment. This is of particular value to new firms.

At the present time the lease-plan applies to 9-ton straight side and 10-ton and 19-ton open back inclinable presses with motors and feeds for these machines. The presses to be leased are of the recently brought out "Fast Feed" type with speeds up to 300 strokes per minute, variable speed controls and automatic roll feeds.

Representation in Brazil Offered Machine Tool Manufacturers

Panambra S. A., Sao Paulo, Brazil, now acting as representatives in Brazil for several American firms, would like to add to their clientele a few additional machine tool manufacturers. They particularly want lines of boring mills, drilling machines, engraving machines, gear cutting machines, milling machines, shapers, planers, power presses, threading machines, but are open for other types of machine tools.

Catalogs and inquiries should be sent to Mr. Eugene J. Lahr at Pan American Trade Development Corp., 40 Wall Street, New York, New York.

Teknillinen Korkeakoulu Needs Books

Finland's Technology Institute, Teknillinen Korkeakoulu, was bombed during the war and totally destroyed. Inas-

much as it is presently difficult to replace this library, the Director of the Institute, Dr. Martti Levon, would welcome gifts of scientific and technical books from America to take the place of those that were destroyed. It would be a practical act of friendship to a nation that holds America in high regard if American engineers and production men would contribute good technical books and periodicals to this library.

Packages of books should be marked for "Institute of Technology, Helsinki," and addressed to the Finnish Legation, 2144 Wyoming Avenue N. E., Washington, D. C.

Spring Making Machinery Wanted

Salvador Scripelliti & Cia., Caixa Postal, 4340, São Paulo, Brazil is in need of machinery for the manufacture of springs for automobiles and other vehicles. Manufacturers of such machinery are invited to send catalogs and prices to the firm mentioned.

Obituary

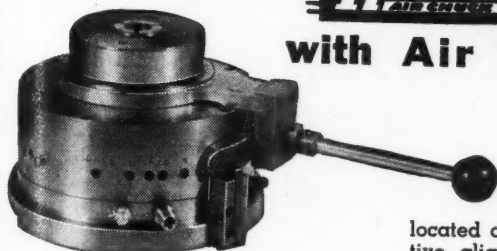
Joseph L. Trecker, 45, president of the Kearney & Trecker Corporation, builders of precision and production machine tools for milling and boring, collapsed and died of a heart attack at his desk Tuesday, October 7.

Mr. Trecker joined the company, founded in 1898 by his father, Theodore, and Mr. E. J. Kearney, in 1925 soon after he left college. He was widely known in industry throughout the country and was an officer and director of the National Machine Tool Builders' Association.

Mr. Trecker is survived in addition to Mrs. Trecker and their three children, Robert, Joan and Theodore, by his father Theodore, Sr.; three brothers, Theodore, Jr., Edgar W. and Francis J.; two sisters, Mrs. Lydia Busch and Bertha.

"Air Devices by Redmer"

Redmer Index Chuck with Air Operated Collet

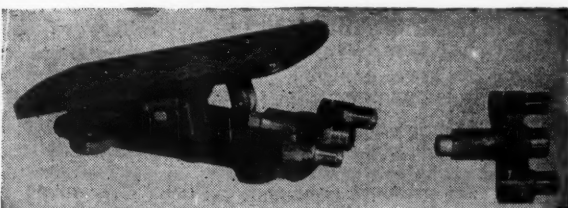


RC-5

Eliminates removing chuck from base of machine for changing index position. Index screw posts located on OUTSIDE of chuck. Provides positive alignment and depth control by using stationary type collets. Capacity 1/16" to 2".



Air Foot Control and Valve



No. FC-28

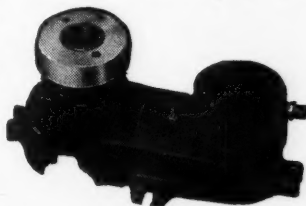
V-29

Designed to make its operation as tireless as possible. Opening and closing of plunger of valve on foot pedal is operated by a roller on pedal casting which relieves wear on plunger and facilitates operation. Valve is a brass casting which will take plenty of abuse and can be removed from the foot control and used as a separate unit in connection with cam operations.



Collet Air Chuck

An air operated collet holding fixture using same type collets as Brown & Sharpe automatic screw machines. For drilling, milling, threading, etc., also for assembly work. Six models, No. 00, No. 10, No. 0, No. 2, No. 2 Special, No. 4, Collet Capacity 1/16" to 3 1/2". AVAILABLE WITH AIR EJECTION OR OIL FLUSHING.

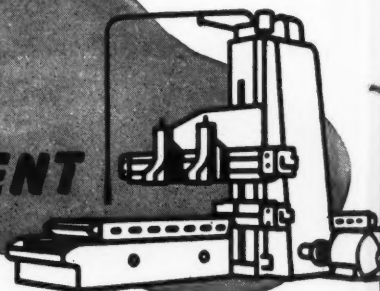


Write for literature and prices

REDMER AIR DEVICES CORP.

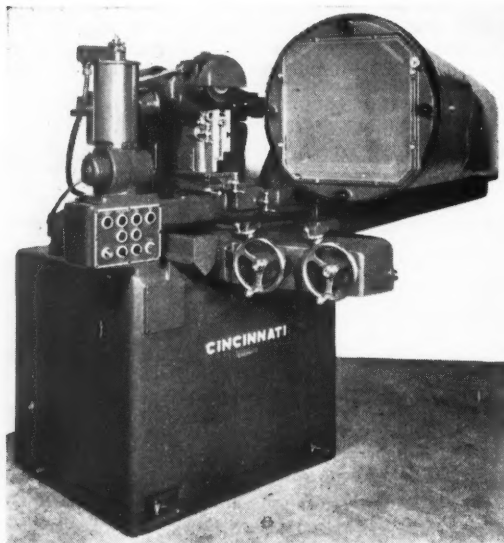
9204 W. BELMONT AVENUE, FRANKLIN PARK, ILL.

NEW SHOP EQUIPMENT



Cincinnati "Projecto-Form" Grinding Machine

The Cincinnati Milling Machine Co., Cincinnati 9, Ohio, announces a machine for the grinding of extremely accurate small profile shapes, to be known as the "Projecto-Form." As its name implies, the machine provides an optically enlarged image of the work which may be compared as grinding progresses with a previously prepared enlarged scale master drawing.



A powerful bulb and a set of condenser lenses focus a brilliant flood of parallel rays of light across the top surface of the workpiece. On the opposite side of the workpiece, and having the workpiece in its plane of focus, is an extremely precise optical projection lens system, which throws a greatly magnified silhouette image of the work profile on a ground glass viewing screen. The screen image corresponds exactly to the work profile as viewed from the operating position, without inversion or transposition, thereby preventing confusion in the positioning of the work or grinding wheel. A magnification of 20 to 1 is supplied as standard, and a 40-to-1 ratio is available on order.

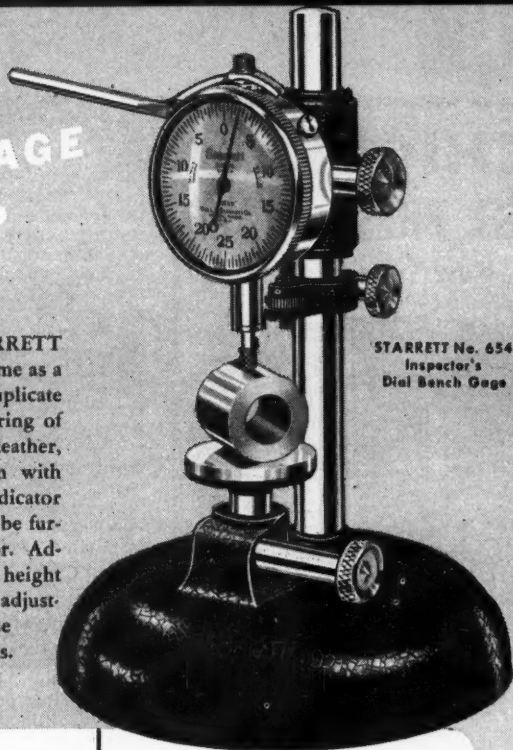
The "master" drawing, an enlarged, true scale duplicate of the desired work profile, is mounted behind, and in contact with, the ground glass viewing screen to permit comparison with the projected image. The projection unit is completely enclosed in a light-tight hood to maintain a brilliant screen image without dilution by the normal room lighting.

The workpiece may be positioned in relation to the optical system by means of longitudinal, transverse, and vertical

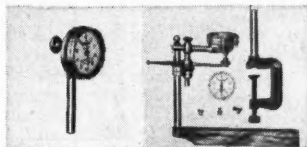
Cincinnati "Projecto-Form"
Grinding Machine

THE SHOP

easy to adjust, easy to use, this STARRETT Precision Bench Gage works full time as a production inspection gage for duplicate parts or for quick, accurate measuring of metal, rubber, textiles, paper, leather, neer, plastics, mica, etc. Shown with STARRETT No. 25-B Dial Indicator graduated .0005"; 0-25-0) it can be furnished with any desired indicator. Adjustable for table and indicator height with lateral and fine perpendicular adjustment. Range 0 to 3 inches, base diameter 5½ inches, height 8 inches.

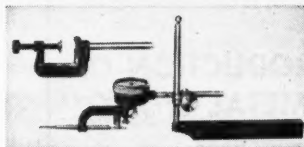


STARRETT No. 654
Inspector's
Dial Bench Gage



UNIVERSAL DIAL TEST
INDICATOR NO. 196

Simple, reliable, sensitive, easy to read, easy to set up and use—that's what makes STARRETT Dial Test Indicator No. 196 a favorite with toolmakers, machinists and inspectors. Many special attachments provide for universal application to all classes of work. Dial graduated .001", reading 0-100, range .200".



HEAVY DUTY DIAL TEST
INDICATOR NO. 645

For severe applications around machinery or for continuous use in general tool work, No. 645 has a special, spiral-type mechanism of unusually rugged construction. Combines sensitive, accurate action with easy-to-read dial. Available to read 0-50-0, 0-20-0, 0-40 or 0-100 by thousandths, range .200".

Write for new Starrett Dial Indicator Catalog "MD"

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World's Greatest Toolmakers

STARRETT

PRECISION TOOLS • DIAL INDICATORS • STEEL TAPES • GROUND FLAT STOCK
HACKSAWS • BAND SAWS FOR CUTTING METAL, WOOD, PLASTICS

CHICAGO STEEL PRESS BRAKE

New Type "300"



SPEED PRODUCTION OF SHEET METAL WORK

USE FOR

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The New Type "300" CHICAGO STEEL PRESS is accurate, compact, and ruggedly constructed of highest quality materials. Sizes 4, 5 and 6 ft. capacities up to 10 gauge.

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ILLINOIS

slides, and a swivel movement of the work platen provides for angular adjustments of the work. These movements provide the means for accurately locating the projected image in relation to the master drawing, and are quickly and easily accomplished by means of hand positioning ballcranks. A precision measuring attachment is available for jobs which require accurate adjustments of the transverse and vertical work support slides.

The grinding wheelhead is carried on transverse and vertical slides to provide for adjustment of the grinding wheel in relation to the workpiece. The handwheel controls for these slides are carried on a bracket which projects from the front of the machine at the operating position in front of the viewing screen. Each slide is controlled by a pair of handwheels, a large one for rough positioning and a small one for fine adjustments. The small handwheel provides for extremely sensitive positioning of the grinding wheel since the wheel is moved only 0.001 inch for each revolution of the handwheel.

In addition, the wheelhead itself is mounted on a slide which provides longitudinal reciprocation of the wheel parallel to the optical axis of the projection system. Reciprocation is accomplished by a hydraulic cylinder and piston. The length of stroke is adjustable and the speed of stroke in each direction is infinitely variable.

The slide in which the wheelhead reciprocates is carried in a double trunnion type mount to permit angular adjustment of wheel reciprocation in both horizontal and vertical planes. This arrangement provides a means for grinding end and side clearances of cutter teeth or punches, without changing position of workpiece in relation to the optical system.

An important advantage of the machine is the fact that the workpiece, and consequently its image on the viewing screen, remains stationary at all times during the grinding operation. All movements necessary for grinding profile shapes are provided by the vertical and transverse adjustments of the grinding wheel in relation to the workpiece. A basic advantage of the machine lies in the type of optical enlargement, since it involves very little eyestrain or muscular fatigue to observe an enlarged shadow image, sharply and brilliantly outlined on a shielded ground glass screen directly in front of an operator comfortably seated in the operating position.

For jobs requiring the grinding of circular form tools, or other formed circular parts, a power driven circular grinding attachment is available.

CHROMIUM-PLATED JO-BLOCKS

Make MANY TIMES
AS MANY Gagings

with
Millionth-Inch Accuracy
Unimpaired!

The harder your gage blocks have to work, the more you'll **SAVE** with chromium-plated Jo-Blocks. Wherever service is at all severe, they'll far outlast plain steel blocks.

The resistance of chromium-plated Jo-Blocks to abrasion or impact is many times that of unprotected steel. They are also far more resistant to corrosive effects of skin acids and moisture. Being lapped and burnished to specified dimension *after* plating, their warranted accuracies are precisely the same as those of unplated Jo-Blocks.

Old sets of Jo-Blocks or gage blocks of any make, in sizes from .050" to 4.000", may be turned in to the factory for credit on new chromium-plated sets. New chromium-plated Jo-Blocks may also be purchased without trade-in.

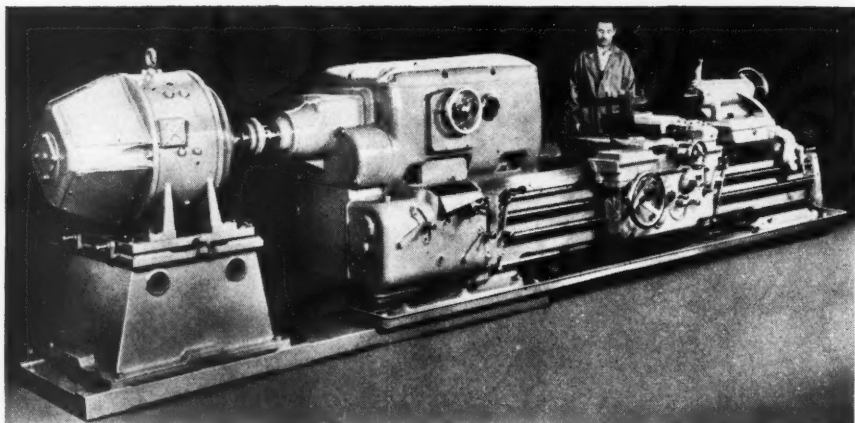
The first chromium-plated gage blocks were produced by Ford Motor Company more than twenty years ago. Service records abundantly prove the vastly longer life of these fine, hard-surfaced tools. Write for literature.

**FORD MOTOR COMPANY
JOHANSSON DIVISION
3607 SCHAEFER ROAD
DEARBORN, MICH.**



Johansson

GAGE BLOCKS



Monarch Model 150 32-Inch Engine Lathe

Monarch Model 150 32-Inch Engine Lathe

To provide more than average swing plus sufficient power to remove stock at an unusually rapid rate, The Monarch Machine Tool Co., Sidney, Ohio, has developed the Monarch Model 150 32-Inch Engine Lathe illustrated herewith. The machine is said to be particularly applicable in railroad shops, steel mills, large shaft manufacture, and so on, wherever stock may be "hogged" from large diameter work.

A separately mounted motor generator set converts a.c. to the d.c. required by a 50 h.p., 600 to 1,200 r.p.m. motor. Speeds of 9 to 1,200 r.p.m. are provided. Seven speed ranges are available, six of them being obtained through back gearing. A two-to-one variation in speed can be controlled from the apron. For example, if

a shaft being turned has a maximum diameter of 10 inches and the smallest diameter is over 5 inches, the operator need not move from his normal operating position in front of the apron. Should the diameter variation be greater, a completely new means is provided for shifting from one speed to another. Mounted on the front of the headstock are a large range selector handwheel and a speed control knob. Nearby is a tachometer. The operator merely selects the speed range which includes the speed he wishes to employ for a given cut. He then re-engages the apron control lever, after which he turns the control knob until the tachometer registers the desired speed. A hydraulic mechanism does the actual work of changing the gear ratio and starting the spindle. Starting and stopping of the spindle can also be accomplished very easily from the apron since the clutch is en-

CARROLL DIVIDING HEADS



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3 SIZES - 4 MODELS - 6" to 12"

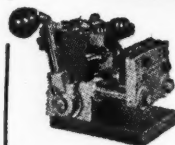
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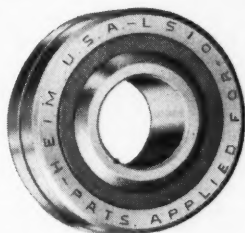
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SPHERICAL BEARINGS AND ROD ENDS

are used in heavy machinery such as this Failing Oil Well Drill . . . as well as in smaller equipment.



The George E. Failing Supply Co., Enid, Oklahoma, has found HEIM Unibal Bearings and Rod Ends unusually efficient and economical and use seven HEIM Rod Ends and one large diameter HEIM Unibal Bearing in their #2500 Holemaster.

The HEIM Unibal has large contact areas, provides for misalignment in all directions, and carries maximum radial and thrust loads. This revolutionary, new principle is meeting with the enthusiastic approval of manufacturers of both large and small equipment.

Wherever power and motion are transmitted, even at odd and varying angles, you will find the HEIM Unibal Bearing or Rod End deserves a place in your design.

Please write for complete catalog.

HEIM also makes
Die Polishing Machines
Pillow Blocks
Roller Bearings



THE HEIM



COMPANY

FAIRFIELD,

CONN.

gaged by hydraulic power.

The massiveness of the headstock is indicated by the fact that the spindle has an 11-inch American standard Cam-lock nose. With this type of spindle nose, chucks and faceplates may be quickly and securely mounted. The spindle is supported by double precision roller bearings. Lubrication is automatic, the oil to the spindle bearings being filtered continuously.

The machine is equipped with an individually motor-driven rapid traverse, electrically controlled from the apron. The operator may position the carriage right up to the workpiece or return it quickly at the end of the cut. Pushing the left-hand control button causes the carriage to go left; pushing the right-hand control button causes it to go right. As soon as pressure on either button is released, the carriage stops. At the end of the traverse return, the gear train automatically disengages so that the carriage may readily be traversed by hand.

All gears in the lathe, as well as all other working parts, are made of hardened alloy steel. Anti-friction bearings are used throughout. The apron has cam-operated frictions. Automatic force feed lubrication, filtered and metered, is supplied to the carriage bearings on the bed,

the bearings of the cross slide on the carriage; and all working parts of the apron. Bed ways are flame hardened and ground. The 48 feeds range from 0.006 to 0.363 inch, and the 48 threads range from $\frac{1}{4}$ to 28.

The machine is available in sizes from 60 to 276 inches between centers in increments of 24 inches. Net weight of the 84-inch size, including all electrical equipment, is approximately 50,000 pounds.

Fosdick 21-Inch Upright Drill

Designed to provide a capacity between the sensitive drill and heavy duty upright drill, the Fosdick 21-Inch Upright Drill illustrated herewith has been brought out by The Fosdick Machine Tool Co., Cincinnati 23, Ohio. The gearbox of the machine provides for 9 or 18 speeds and 4 feeds. Any range of speeds from 110 to 900 r.p.m. or 220 to 3,600 r.p.m. can be obtained, with feeds of from 0.002 to 0.010 inch or 0.004 to 0.020 inch.

The gearbox is cast integral with the top bracket. A pump is placed directly underneath the gearbox to supply oil to the bearings and heat-treated gears. The drive to the spindles is through multiple



MODEL B-300
3" Diameter

Write for bulletins.

LOWN

SLIP ROLL FORMING MACHINES

Meet Job Requirements

for Peak Production

Our machines are fast, efficient, sturdy, and easy to operate. They are built in a range of sizes from which you can choose the exact unit required.

SAN ANGELO FOUNDRY & MACHINE COMPANY

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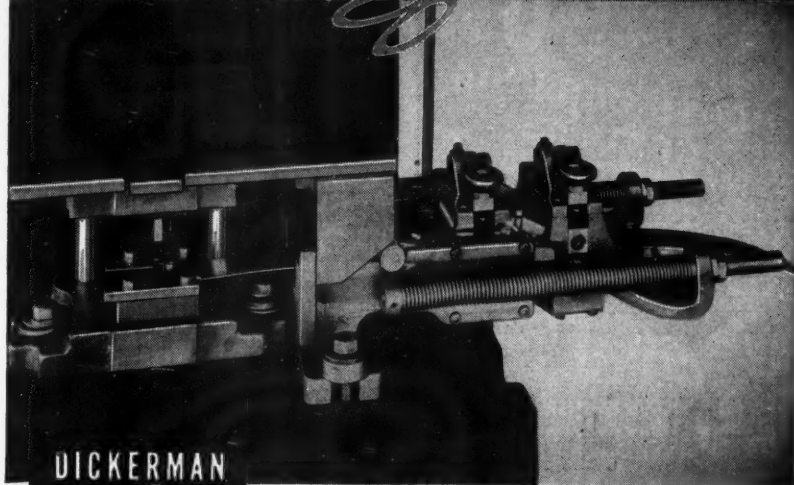
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COST CUTTING AID

TIMELY



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automatic

**DIE
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Punch Press Feeding Simplified

If you appreciate the factor of human error... as you do! And the cost of die repairs and wasted material... then you need automatic Dickerman Die Feeds that require no motor, no connection with the power shaft of the press. Used with Producto Die Sets they form a combination that will give

years of trouble-free operation, feeding all coiled stamping materials, up to $\frac{3}{16}$ " thick — 6" wide, accurately, without jams. Installed in any position for any style die. Call "Near Neighbor Service" for Bulletin.

EXCLUSIVE DISTRIBUTOR FOR DICKERMAN AUTOMATIC FEEDS

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Jamison Steel Corp.
Exbrook 2930

ELMIRA, N. Y.
R. C. Neal Co., Inc.
5168

THE PRODUCTO MACHINE COMPANY

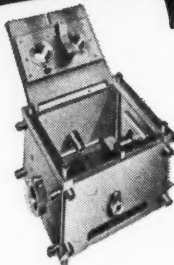
960 Housatonic Ave. • Bridgeport 1 Conn. • Tel. 4-9481

NEW *Drillet* JIG BOX CUTS DRILL JIG COSTS 75%

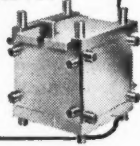
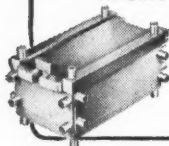
DOES AWAY WITH
SPECIAL TOOL DESIGN
OF THE JIG BODY



Casting Machined
by using standard
Drillet Jig Box



BUILT IN STANDARD SIZES AND
SHAPES UP TO 6" x 6" x 6"
PATENTS APPLIED FOR



The Drillet Jig Box is a six sided leaf type jig for all phases of drill press operation. Tooling expense can be reduced as much as 75%. All that is necessary is for toolmaker to locate part and insert drill bushings. Eliminates preliminary steps required in building and squaring jig. Side plates, end plates and leaves are replaceable for immediate delivery. Before investing hundreds of dollars in your toolmaker's time—Write for Literature and Prices.

Full Scale Tracing Templates with Orders
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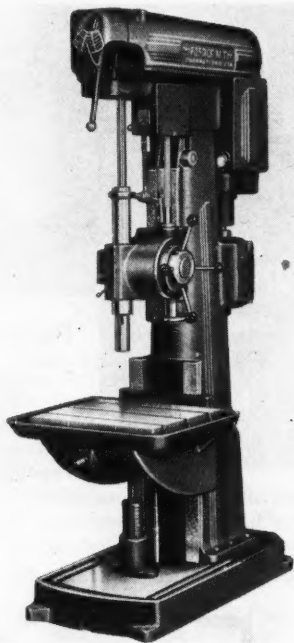
CHICAGO

DRILLET CORPORATION

1759 N. Winchester Ave., Chicago 22, Ill

V-belts. A single or two-speed motor is placed directly underneath the top bracket, bolted in a vertical position on the top column, and connected to the gearbox by means of a coupling. The start and stop button of the machine is located directly in front of the operator. A single lever control used for speeds and feeds is also located directly in front of the operator.

The power feed is operated from a positive clutch which actuates two serrated blocks engaging in a serrated ring. The



Fosdick 21-Inch Upright Drill

clutch is engaged by pulling forward on a 4-spoke lever. The feed clutch engages when the drill contacts the work. An over-take feature is incorporated with the power feed so that the drill can be advanced without disengaging the feed dial. The large dial with graduations on the peripheral located directly in front of the operator can be set to provide any desired depth, and is designed to measure the full depth of spindle travel without resetting. A lock-out is provided to pre-

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As Demonstrated in Chicago



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Every day, production men are finding new ways to cut corners on countless jobs with P&W Keller Burs — the most complete and advanced line in the world.

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vent the power feed from engaging when it is desired to operate the machine by hand. Quick return of the spindle can be provided by changing the position of the counterbalance chain.

A magnetic switch is provided to reverse the direction of rotation of the motor. A two-position knob located on the head can be set for tapping or for drilling. After one knob is placed in the proper position, the tap, when moving the 4-spoke lever down, rotates in the correct direction. When moving the handwheel back, the motor operates in the opposite direction, thereby backing out the tap.



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THE GRANT MFG. & MACHINE CO.
96 Stillman Ave. Bridgeport 3, Conn.

When the knob is set for drilling and the spoke lever is moved back, the spindle will not reverse the drill, thus preventing damaging of the cutting edge. A trip is provided which can be set for any depth of hole. The tapping controller can be wired for left-hand tapping or can be wired for either selective right or left-hand tapping. Unless otherwise specified, the machine is furnished with standard spindle speeds of 110 to 1,800 r.p.m. Three longitudinal T-slots are provided on the machine as standard.

LeBlond Model RT 16-Inch Toolroom Lathe

An unusually wide range of spindle speeds and increased ease of operation are outstanding features claimed for the LeBlond Model RT 16-Inch Toolroom Lathe illustrated herewith, product of The R. K. LeBlond Machine Tool Co., Dept. MMS, Cincinnati 8, Ohio. Over 300 speeds ranging from 6 to 1,500 r.p.m. are controlled by a unique speed adjuster unit. More than 100 speeds may be obtained in each of three ranges without stopping the spindle, thus resulting in unusually fast operation and minimum operator fatigue.

Other features of the machine include universal power rapid traverse for the carriage, cross slide, and tailstock; totally-enclosed universal quick-change box; revolving index plate on the feed box which contains simple instructions for obtaining five different types of 60 threads and leads each; and automatic lubrication throughout the headstock, feed box, and apron. Moreover, the lathe features a combination gear-belt drive headstock which provides spindle speeds in three ranges; combined feed apron which has a special arrangement for con-

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20" Long x 12"
Wide x 6 1/4" Deep
16 Ga., drag holes,
handles both ends.

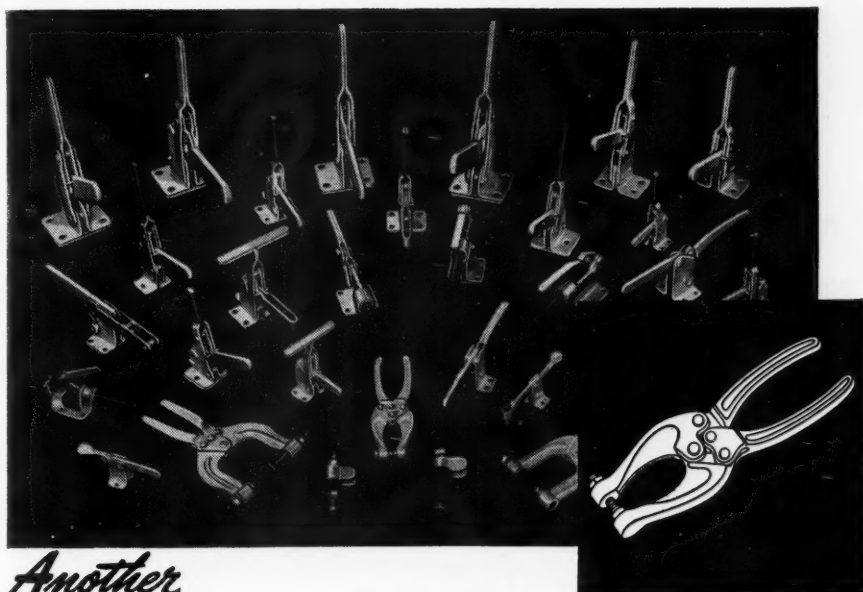


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Another

DE-STA-CO CLAMP

Designed to *Take It!*

A new addition to the versatile De-Sta-Co family of production clamping tools. No. 464 Portable Clamp designed for sheet metal work. Positive toggle lock holds parts fixed for drilling, riveting, welding. Speeds assembly of ducts, housings, cabinets, auto bodies. Ideal for template work.

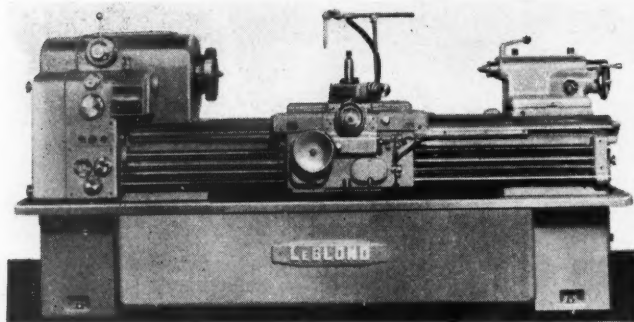
No. 464 Plier Clamp offers a firm hand grip for opening and closing. Jaws clear flanged metal edges. Adjustable for efficient pressures. Narrow nose for close spaces. Entire tool is forged and can be altered easily for special application. Replaceable hardened steel bushings minimize wear. Write for additional information on Model 464, or catalog No. 47 describing complete line.

De-Sta-Co clamps are stocked in principal industrial centers

DETROIT STAMPING COMPANY

349 Midland Ave.

Detroit 3, Mich.



LeBlond Model RT 16-Inch Toolroom Lathe

meeting length and cross feeds for cutting steep tapers in connection with a geared type taper attachment; thrust-lock tailstock with worm and rack construction which provides full-length bearing support for the spindle barrel; and L-shaped bed which supports the entire headstock base and which is fitted with replaceable flame hardened and ground steel ways in the front and rear.

The variable speed drive with which the LeBlond Model RT 16-Inch Toolroom Lathe is powered consists essentially of

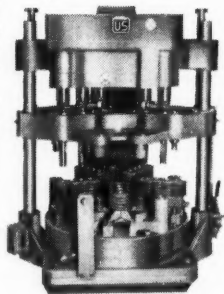
four elements; namely, a speed control unit, $7\frac{1}{2}$ hp. adjustable speed main drive motor, speed adjuster unit with rheostat, and motor generator. The drive is said to provide sufficient torque with controlled acceleration for all starting conditions and to stop quickly through dynamic braking. The motor may be stopped and started without interfering with the speed setting. The three-purpose speed adjuster unit, which is located within easy reach of the operator's normal working position, consists of a shifter for shifting to any one of three drives; speed selector dial for varying the speed of the main drive motor; and button for jogging the main drive motor.

An 8-hour day's work finished in 49 minutes

The Campbell-Hausfeld Co. of Harrison, Ohio, large manufacturers of Air Compressors, have been able to accomplish in less than one hour what they formerly did in one 8-hour working day. U. S. Drill Head Co. made this possible!

This photograph shows a drilling head complete with boring bars with Carbide tipped cutters and Stellite wear strips. The five-position indexing table has necessary holding fixtures with bushing guide plate suspended from head, locating over hardened dowel pins in each position in the fixture.

Operation: Semi-finish cylinder bore to 1.373—1.3735" for honing operation.



Production: 90 pieces per hour 85% efficient.

Machine operates as follows enlarging $1\frac{1}{4}$ " cored hole to 1.373" diameter:

Station #1: Unload and load one piece.

Station #2: Rough bore two cylinder holes.

Station #3: Rough bore two cylinder holes to 1.340" diameter.

Station #4: Semi-finish two cylinder bores.

Station #5: Semi-finish two cylinder bored to 1.373-1.3735" diameter.

This allows only .002—.0015" stock to be removed by honing machine, which formerly had to be .006" to .007" due out of roundness of holes; thus cutting time for this operation.

Also manufacturers of all types of fixed center heads.
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*Photo courtesy of
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Designers and builders of
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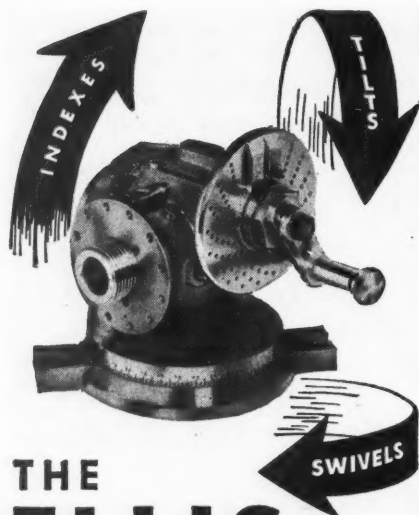
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IN ADDITION, they reduce operator hours 80 to 90 percent, due to their accuracy, reliability, versatility. They increase die life through elimination of costly jams and crack-ups — can be attached to any press.

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322-115 ALBANY STREET • SPRINGFIELD, MASS.



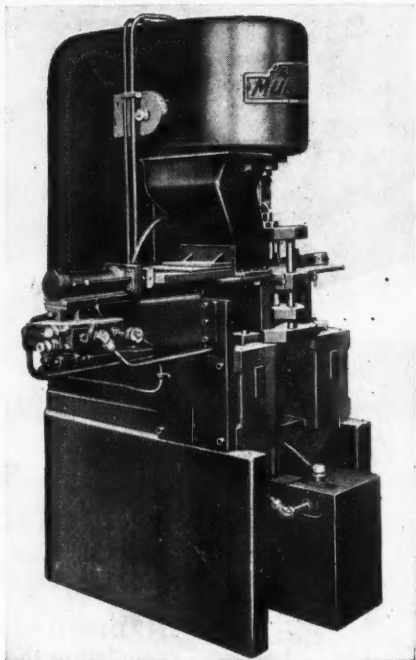
THE ELLIS DIVIDING HEAD

Many unique features make the ELLIS Dividing Head more than an ordinary indexing fixture. It is a precise, rugged unit with $6\frac{1}{2}$ " normal swing increased to 11" swing through the use of riser blocks. It TILTS more than 100 degrees in the vertical plane—SWIVELS 360 degrees in the horizontal plane—INDEXES by crank, or directly by hand. Work is held between centers, or in chucks or collets. The ELLIS Dividing Head is a universal work head that will increase the production versatility of your milling machines, grinders, drill presses and jig borers—write for complete details today.



Denison Automatic Pelleting Multipress

According to The Denison Engineering Co., 1160 Dublin Rd., Columbus 16, Ohio, plants processing powdered or granular forms of ceramics, chemicals, plastics, or metals will be particularly interested in the Denison Automatic Pelleting Multipress shown in the accompanying illustration. Features of the machine include independent control of charging, compacting, and ejecting ram actions; a con-



Denison Automatic Pelleting Multipress

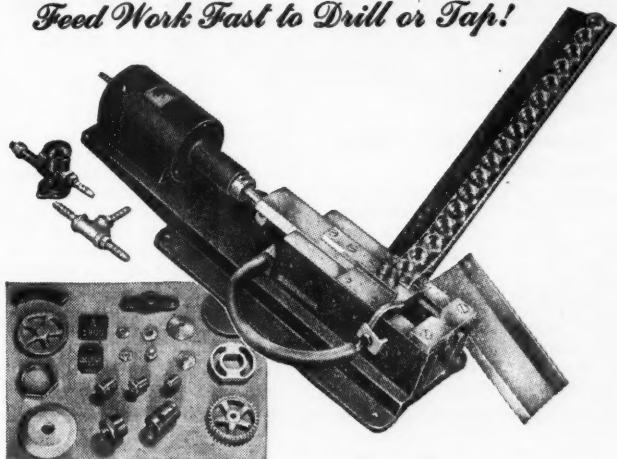
struction which allows for easy tooling for rapid die changes, easy cleaning, and quick die fill adjustment; suitability for single or multiple cavity dies (solid or cored parts); and ram actions which are fully automatic and completely interlocked regardless of individual regulations.

The company's vibratory control principle is incorporated in the press in both the die charging and compacting rams. Repeat strokes of the ram during com-

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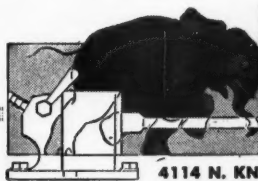
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Write for new Mead **AIR POWER** Catalog describing "Mead Family" of air operated fixtures and devices.



MEAD

SPECIALTIES COMPANY

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paction are said to result in efficient expulsion of air from the die for excellent control of part density, maximum distribution of material in the die, and an ideal finish on the edges of the formed parts. Vibratory action for the charging box is claimed to assure an even die fill and efficient feeding of loose materials from the hopper.

According to the manufacturer, the versatile actions of the Denison Automatic Pelleting Multipress can be easily altered to suit the varied compaction and flow characteristics found in powdered and granular materials.

Fitchburg "Consta-Contac" Valve Seat Grinder

A unique method of cylindrical grinding, known as "Consta-Contac" grinding, by which three or more parts are in constant contact with a single grinding wheel is employed in an automatic valve seat grinder developed by the Fitchburg Grinding Machine Corp., Fitchburg, Mass. According to the manufacturer, the machine will grind automotive engine valve seats at the rate of 2,160 per hour since three valves are in contact

with the wheel, "sparking" at all times. Both loading and unloading of workpieces are effected automatically.

A unique feature of the grinder is the manner in which the valves are fed to grind to size while they pass through a 90-deg. sector of the wheel face. The machine comprises a vertical belt-driven grinding wheel and a vertical turret having 12 grinding spindles to receive the valve stems. The spindles, which are of the quill type, are self-contained and are powered by a 1 h.p. motor operating through a friction drive. The turret is belt-driven by another 1 h.p. motor. The wheel rotates at a speed of 5,000 s.f.p.m. and the valves at 80 to 110 surface feet per minute.

A special design feature is the relationship between the wheel and the turret. The turret axis and the wheel axis are in the same horizontal plane, however, the vertical plane of the turret axis is set at a slight angle to the wheel axis. This angle is selected so that at top center the grinding wheel edge is separated from the valve face path by a distance equal to the average amount of stock to be removed. The angle can be altered by pivoting the table that carries the turret, and the turret drive and spindle motors.

The table is adjusted longitudinally so

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For the first time a production-type press for die tryout. Bolster and head tilt for die finishing. Return to original position.

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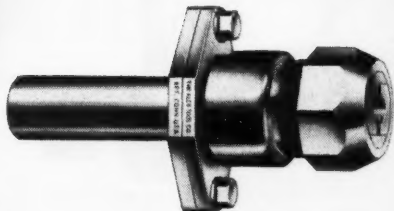
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ALCO

RELEASING MODEL TAP HOLDER



Please write for
new complete
Catalog No. 6.

The tap-holder of hand screw machines and power machines has long been a thought in mind — to produce perfect work with the minimum amount of effort.

ALCO Releasing Type Tap Holders lend themselves admirably to making this an established fact. The solid clutch drive, the concentric alignment of the tap with the hole, the rugged construction of the ALCO tool make this the most outstanding and fool-proof tap holder of all the releasing types. Designed especially for heavy duty work and for cutting threads to the most exacting standards.

The quick and positive alignment of the tap for concentricity saves valuable time in setting up and the fact that wear on the tap is evenly distributed lengthens tap life and prevents breakage.

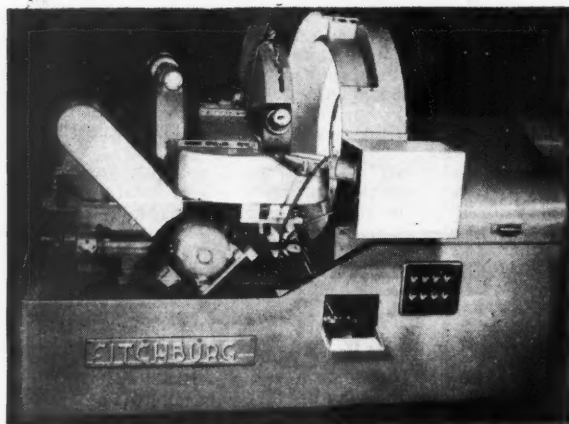
The most convincing method of proving that ALCO Releasing Tap Holders will save time and improve work produced is to install just one of them on your next set-up. Please write for complete engineering data and prices.

ALCO TOOLS

THE ALCO TOOL CO.

152 Birdseye St., Bridgeport, Conn.

Detroit Office: 908 Stephenson Bldg.



**Fitchburg "Consta-Contac"
Valve Seat Grinder**

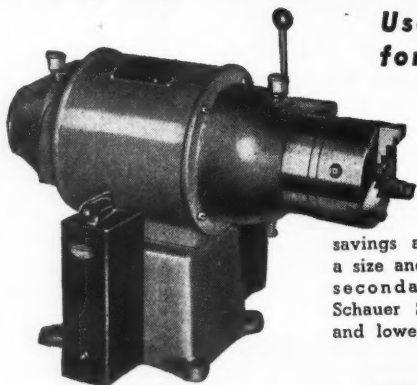
that the rough valve seat will contact the grinding wheel at top center. The wheel surface is beveled at the angle that complements the valve bearing face angle. As the spindle turret rotates to carry the valve downward, the valve feeds across the beveled face of the wheel, and, by the time the valve reaches the hori-

zontal, it is ground to size. A cam releases the work holder to drop the valve on the downward arc onto a belt conveyor, which conveys it out of the machine.

If a particular valve has more or less than the average amount of stock to be removed, no adjustments are necessary since such a valve will intersect the wheel ahead of or behind top center, proportional to the amount of discrepancy. In addition to the simultaneous grinding of three

valves and the automatic size control, the Consta-Contac method is said to provide the advantage of distributing wheel wear since the valve is ground over a wide portion of the grinding wheel face. The wiping action afforded also serves to remove burrs and prevent grooving of the wheel. An automatic truing device with self-con-

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★ 3/4" Width 10-Tooth Blades

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Discontinued during the war in line with governmental simplification regulations, these Hard Edge Flexible Band Saws are now back again as *standard, regularly stocked Barnes items*. Their worth has been proven on all standard horizontal type saws including Johnson, Wells, Kalamazoo, etc., as well as on standard vertical type machines. These blades greatly increase blade life, cut more accurately and at closer tolerances, eliminate possibility of blade breakage.

Available in coils or cut to designated lengths and welded. Your Distributor has both these new "Krimp Set" Band Saws NOW. Order them—try them for greater band sawing efficiency.

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... the 3/4" 18-Tooth Blade with regular set. Specially designed for cutting thin materials. In coils or welded to lengths. Regularly stocked . . . fast delivery.

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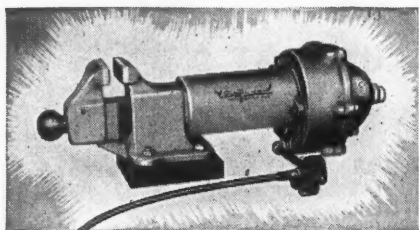
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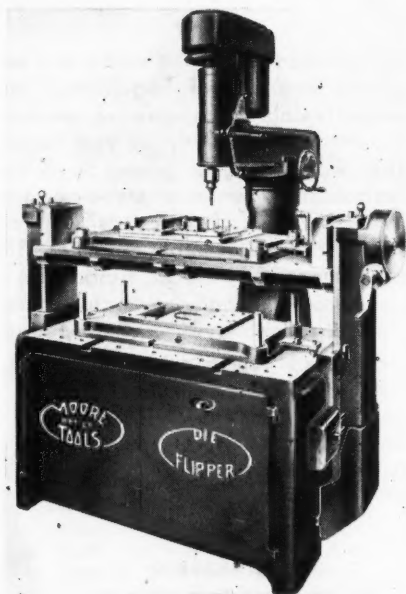
479 ERIE TRUST BLDG., ERIE, PA.



tained compensation allows for dressing of the wheel with only momentary interruption of loading. When desired, the grinding wheel can have both a coarse and a fine cutting surface to provide for both rough and finish grinding in one pass. The grinding wheel can also be formed to grind several diameters and shoulders.

Moore Die Flipper

A diemaker's tryout and assembly machine to be known as the Moore Die Flipper has been developed by the Moore Special Tool Co., Inc., Bridgeport, Conn. Without physical effort, one diemaker, it



Moore Die Flipper

is claimed, can perform all of the operations of die assembling, including take apart, turn over, drill, tap, and tryout.

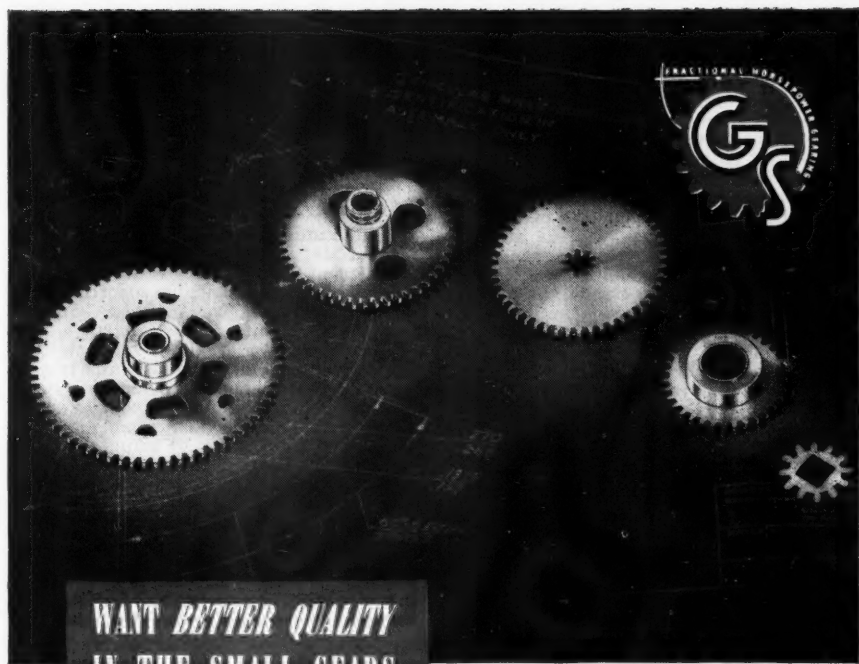
According to the manufacturer, one man operating the Moore Die Flipper can quickly and efficiently test alignment, drill punches in place, tap screw holes, hand stone, and make visual inspection. The punch holder and die shoe are said to be always clamped firmly to the ma-

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chine, thus preventing pinching of fingers and dropping of heavy parts. The machine is designed to take apart and flip over a die set 20 x 40 inches with 12-inch shut height and pins engaged in bushings 4 inches. The unit is so constructed that the platen is said to hold the punch holder parallel to the die shoe under either compression or tension at all times.

An important plus function of the Moore Die Flipper is that of a radial drill for drilling angular as well as straight holes. The machine provides speeds of 200 to 1,200 r.p.m. and can be used to drill holes up to 1½ inches in diameter. All vital parts of the machine subjected to wear are made of hardened and ground alloy steels.

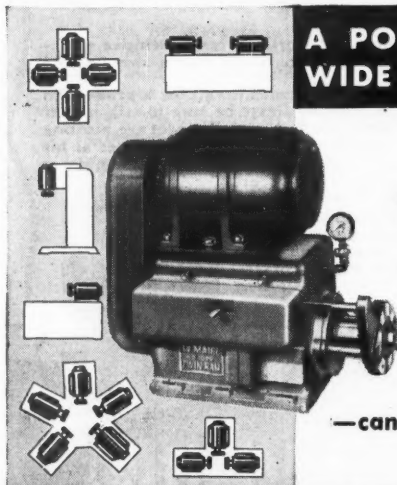
Specifications of the Moore Die Flipper are as follows: working surface of base, 24 x 40 inches; working surface of platen, 14 x 40 inches; working surface of base to floor, 27 inches; platen vertical travel, 15 inches (hand or power); working clearance of base to platen with platen above index plates, 9 inches minimum and 24 inches maximum; distance working surface of base to top of platen with working surface up, 7 inches minimum and 18 inches maximum; platen rotation, 360 deg. (hand only); drill speeds, 200 to 1,200 r.p.m.; drill sizes, up to 1¼ inches; dis-

tance nose of drill chuck to working surface of base, 24 inches maximum; distance nose of drill chuck to working surface of platen with quill up, 6 inches minimum and 17 inches maximum; and quill travel, 5½ inches.

Monarch Magna-Matic Lathe

Outstanding features of the Monarch Magna-Matic Lathe illustrated herewith, product of The Monarch Machine Tool Co., Sidney, Ohio, include electronically-controlled feeds. The lathe is equipped with both a front and rear carriage, each of which may be single or multiple tool-ed. Any number of diameters and lengths with intervening tapers or contours may be turned by utilizing the front carriage. Facing and boring operations may also be easily performed. Facing, necking, forming, and chamfering are the operations ordinarily assigned to the rear carriage.

The drive to the spindle is through multiple V-belts and pickoff gears. The motor, which is mounted in the base of the machine, is readily accessible by the opening of a large hinged cover. Provision is made for the orderly storage of the com-



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- for drilling, boring, reaming, etc.
- vertically, horizontally, or at any angle
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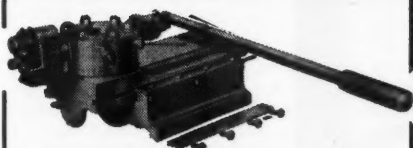
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Famco Foot-Powered Squaring Shears will cut up to 18 gauge mild steel with accuracy and speed. Ruggedly constructed and available in five sizes.

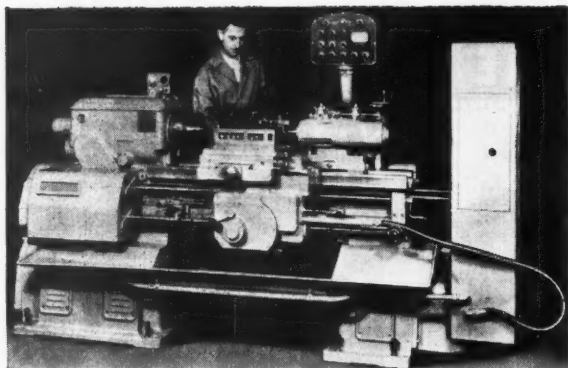


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• SQUARING SHEARS

ARBOR PRESSES • FOOT PRESSES



Monarch Magna-Matic Lathe

during the machining cycle, although ordinarily it is employed only during the rear carriage operations. The headstock spindle is supported by precision roller bearings. Automatic lubrication supplies oil to all moving headstock parts and to the pickoff gears.

For maximum efficiency, the machine is provided with electronically controlled feed motors. Front carriage operation re-

quires two motors; one for the longitudinal feed, the other for the cross feed. Because the rear carriage does not have longitudinal movement, only one feed motor is necessary. The front carriage has an infinitely variable longitudinal feed range of 0.5 to 20 inches per minute and a longitudinal traverse of 80 inches per minute. The cross feed range is 1 to 40 inches per minute. Micrometer stops are provided to limit both traverse movement

plete set of pickoff gears on the inside of this cover. Although usually powered with a 10 h.p., 1,200 or 1,800 r.p.m. motor, certain jobs may be handled more efficiently with a 15 h.p. motor which may also be accommodated in the base. A feature of the Magna-Matic is the automatic speed stepdown which may be obtained from any given pickoff gear combination. The ratio is 6 to 1. Speed stepdown may take place at any time

quires two motors; one for the longitudinal feed, the other for the cross feed. Because the rear carriage does not have longitudinal movement, only one feed motor is necessary. The front carriage has an infinitely variable longitudinal feed range of 0.5 to 20 inches per minute and a longitudinal traverse of 80 inches per minute. The cross feed range is 1 to 40 inches per minute. Micrometer stops are provided to limit both traverse movement

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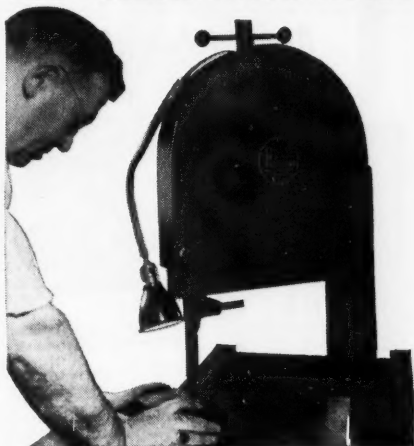
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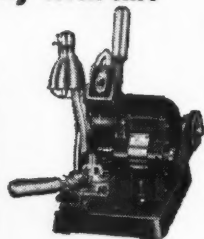
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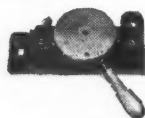
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and cross movement in both directions.

The cross feed range of the rear carriage is 0.5 to 20 inches per minute. Traverse (out only) is 40 inches per minute. Micrometer stops in conjunction with direct reading scales permit quick setup. Automatic lubrication is provided for both the front and the rear carriage. Typical of the flexibility of the Magna-Matic cycle is the fact that the rear carriage may be made to become operative at any time after the start of the cycle. Machines intended for continuous use on work not requiring necking, chamfering, and forming cuts can be supplied without the rear carriage.

Movement of the tailstock along the bedways is effected by means of a rack and handwheel. A direct reading scale enables the operator to position the tailstock in the least possible time during setup. The tailstock spindle is air traversed and air clamped. Final locking is mechanically effected and is such that the spindle remains locked in position even should the air pressure fail.

All motors may be started and stopped and all feeds may be started, stopped, and regulated from a panel located within easy reach of the operator. Once the machine is set up, all the operator need do, in addition to loading and unloading the work, is press the cycle start button. He may stop or reverse the cycle at any time. A visual feed indicator enables him to set up the machine with the certainty that he is selecting the feeds he desires and tells him at a glance the feed being used at any point in the cycle.

The Magna-Matic has a swing of 15 inches over the bed; 7 inches over the carriage. It is available in center distances of 18, 30, 42, 54, and 60 inches. The net weight of the 18-inch machine, including all the electrical equipment, is 5,900 pounds.

Besly No. 320 Vertical Spindle Hydraulic Grinder

Introduction of a vertical spindle hydraulic grinder designed for grinding the faces of hedge shears, wood chisels, plane bodies, scissors, and cutlery is announced by Charles H. Besly and Co., 118-124 N. Clinton St., Chicago 6, Ill. Designated as the No. 320, the grinder features a feed fixture into which the operator places the rough forging. The fixture then swings down into the horizontal position, advances to the grinding wheel, makes the required number of passes back and forth across the grinding wheel and, at

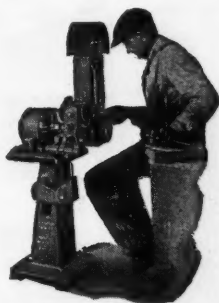
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MAXIMUM PRODUCTION IN CHUCKING AND INDEXING

With the new Dearborn Automatic Indexer connected to a Dearborn Chucking Fixture: chuck is closed automatically; indexed the required number of times automatically; chuck is opened automatically; piece is knocked out automatically.

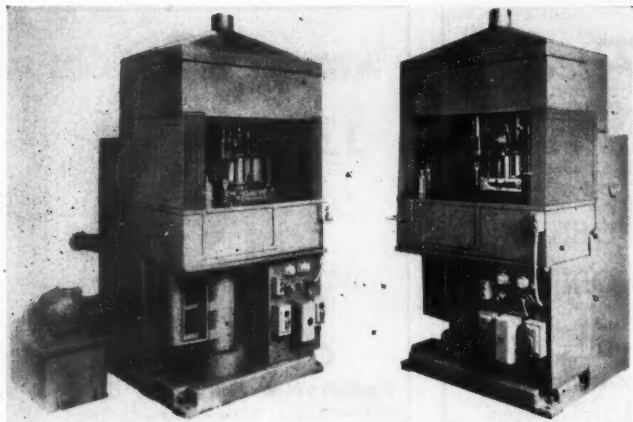


Write for further
information.

When used with the Dearborn Degree Indexing Fixture it can quickly be set to index any number of degrees from 30° to 90° at one indexing and then knock out, or it can be set to index from no degrees to 90° and then not knock out.

J. W. DEARBORN

Ansonia, Conn.



Besly No. 320 Vertical Spindle Hydraulic Grinder









the same time, feeds down mechanically. Upon reaching the micrometer stop screw, the work automatically recedes from the grinding wheel and returns to the loading and unloading position. The operator's normal position is between two of these machines where he takes a semi-finished forging from one machine and

places the forging in the other machine for grinding the opposite side.

Oil is used as a coolant and, as a result of the design of the machine, most of the mist can be controlled. The number of work passes across the face of the grinding wheel, the speed at which the work passes back and forth across the wheel, the amount of hydraulic pressure exerted, and the speed of the down-feed are all subject to variation at the operator's option. According to the manufacturer, the machine is designed to speed the grinding of hedge shears to a rate wherein one operator with two of the

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<p>TUBE DEBURRING CUTTERS (Standard)</p>  <p>18 Standards in H.S.S. and Cemented Carbide</p> <p>ADJUSTABLE TYPE</p>  <p>Adjustable from 1/2" - 2-1/2" O.D.—for short runs</p>	<p>TUBE CHAMFERING MILLS</p>  <p>23 sizes from 3/16" - 2-1/2" O.D. — Chatterless</p>	<p>SOLID TUBE DEBURRING CUTTERS</p>  <p>16 sizes from 1/4" - 1-5/8" O.D. — H.S.S. and Carbide</p>	<p>SPECIAL TUBING CUTTERS</p>    
<p>From light hand-deburring up to close tolerance deburring, chamfering, flaring . . . For working non-ferrous metal, steel (including stainless) and plastic tubing . . . For combining reaming, sizing or flaring with end facing and deburring . . . Whatever the operation or material, Severance HSS and Cemented Carbide Tube Deburring Cutters are TOPS in performance — long life — economy.</p> <p style="text-align: right;">Write for Catalog No. 16</p>			

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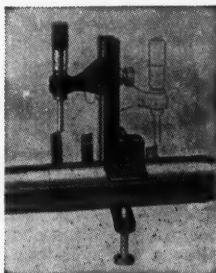
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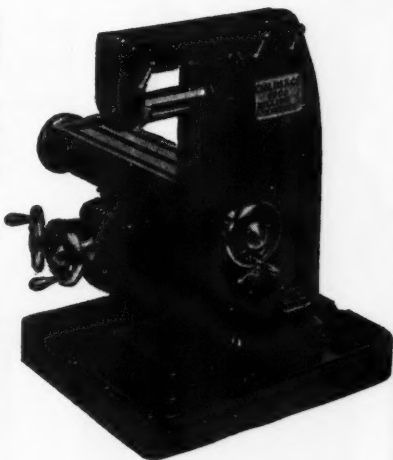
CAPACITY: Longitudinal feed 6", transverse feed 1½", vertical feed 4".

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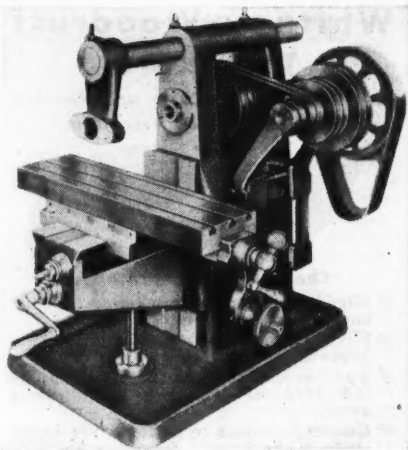


machines can grind 600 surfaces per hour or 300 complete hedge shears. By changing fixtures, the machine can also be used to bevel grind hedge shears and may be used on a wide variety of flat surfaces, including plane and combination square bodies.

Diamond Model B-12 Milling Machine

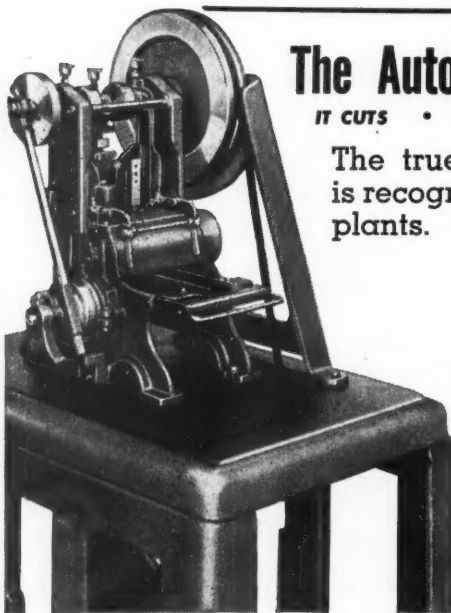
Designated as the Model B-12, a bench type milling machine weighing 450 lb. is now being manufactured by the Diamond Machine Tool Co., 3429 E. Olympic Blvd., Los Angeles 23, Calif. The machine features a $4\frac{1}{2}$ x 20-inch table with a longitudinal travel of 12 inches, vertical travel of 9 inches, and transverse travel of 6 inches. Three table T-slots are provided so as to allow for convenient mounting of work.

The heat-treated spindle of the machine is mounted in tapered roller bearings and is provided with a No. 9 B & S taper. The spindle nose is hardened and ground for concentricity and finish. A needle type bearing mounted in the overarm bracket is said to provide a friction-free trouble-proof support for the arbor.



Diamond Model B-12 Milling Machine

Power is transmitted to the spindle by means of a three-step pulley with double "B" V-belts which are claimed to afford an unusually powerful drive for heavy



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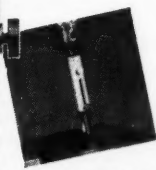
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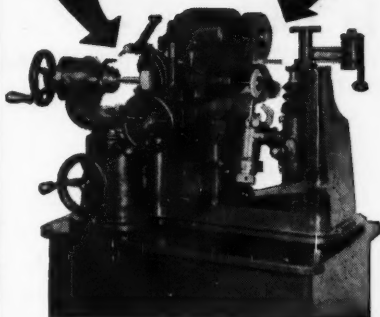
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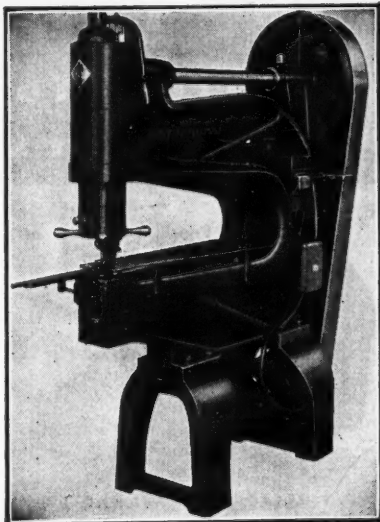
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to-1 ratio of cam lobe rise to longitudinal feed is said to further increase inherent accuracy.

With the Brown & Sharpe Pinion Turning Machine, consistent accuracy in staff and pinion turning is made practically automatic, the manufacturer states. Uniformly rapid automatic movements, regardless of the time required to make a part, are ensured by a constant speed drive shaft. Change gears provide rates of production of from 3 to 364 seconds for one piece per cycle. The machine, which is provided with 16 spindle speeds of from 10,000 to 910 r.p.m., is designed to accommodate stock up to $\frac{1}{4}$ inch in diameter and to turn a length of work up to 2 $\frac{7}{8}$ inches. The unit is driven by a 2 h.p. speed motor mounted inside the base on an adjustable bracket.

Standard No. 35 Twin-Motor Variable Speed Snagging Grinder

Development of a twin-motor variable speed snagging grinder having two 24 x 3 x 12-inch grinding wheels is announced by The Standard Electrical Tool Co.,

2518 River Rd., Cincinnati 4, Ohio. Designated as the No. 35, the machine is a two-in-one unit—each operator is entirely independent of the other. The wheel on one side of the machine may be stationary while the other wheel is operating; one side may be operated with a wheel differing in diameter from the wheel on the other side, however, each wheel is operated at its correct and efficient peripheral speed.

The construction of the Standard No. 35 Twin-Motor Variable Speed Snagging Grinder includes two independent spindles, two 7 $\frac{1}{2}$ h.p. motors, two magnetic starters, two shaft locks, two infinitely variable speed drives, two handwheel controls, and two interlocking arrangements to prevent overspeeding of the grinding wheels. The machine is designed primarily for use with high speed resinoid bond wheels and has an infinite speed range of from 1,580 to 2,200 r.p.m. Utilizing this speed range, the reduced diameter grinding wheel can be constantly operated at 9,500 s.f.m. until discarded.

The speed control is unique in design and is said to definitely prevent overspeeding of the grinding wheels. As the individual grinding wheel wears, the guard can be adjusted, as well as the handwheel



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200 - 1000 r. p. m. Bring thumb nail to bear against centering head until it runs true. Stop machine and focus on work. Keep eye at least 4 inches from viewing aperture.

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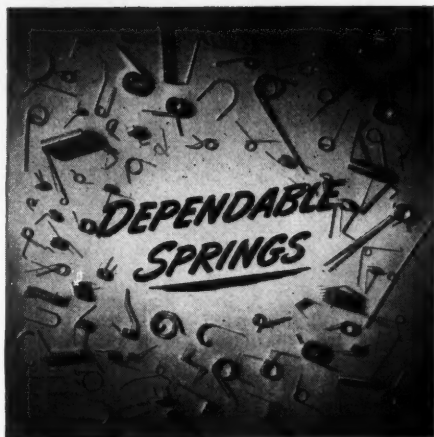
Locate cross lines on work to match lines in viewing aperture.

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catalogue No. 12

CENTER SCOPE PRODUCTS

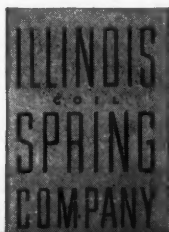
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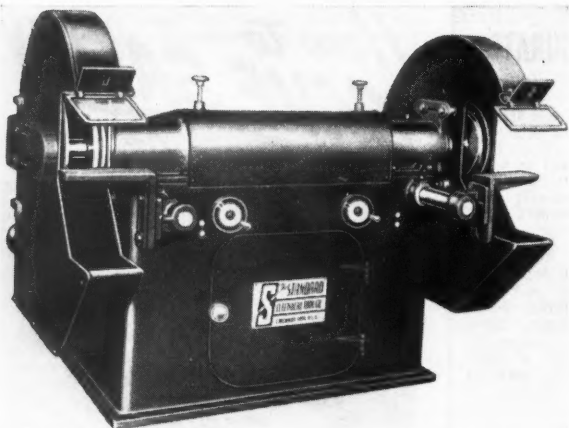
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Standard No. 35 Twin-Motor
Variable Speed Snagging
Grinder

full diameter wheel cannot be mounted until the handwheel speed control has been reversed to its original position, thus allowing the wheel guard to be brought to its extreme forward position to provide clearance for the full diameter wheel.

speed control. A limit-stop reflects the correct spindle speed in relation to the worn wheel diameter; speed change can be made at random, always reflecting the correct peripheral speed, it is claimed. A

Pines Improved Bending Machine

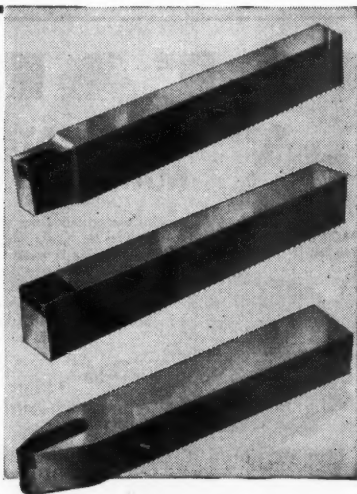
The Pines Engineering Co., Inc., 601 Walnut St., Aurora, Ill., announces important improvements in its bending ma-

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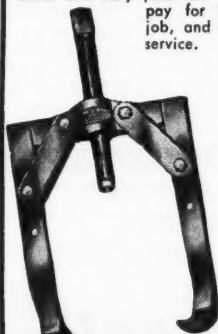
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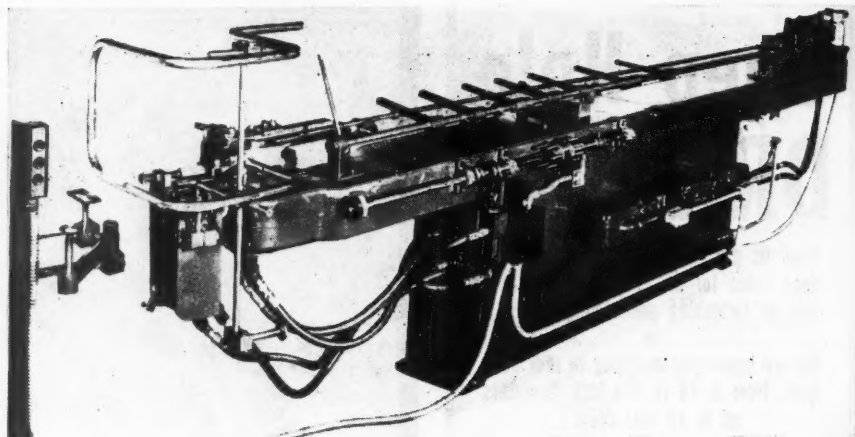
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Pines Improved Bending Machine

chine. Designed to speed up the production of bends in pipe, bars, tubes, and extruded shapes, the machine features a finger-tip control and built-in adjustments which permit single duplication of a series of various bends on each piece throughout an entire lot.

Pressing the "start" button of the machine initiates a cycle which (1) activates a clamp against the work; (2) engages a pressure die which feeds tangentially with the work into the bending die; (3) rotates the bending arm to the required angle of arc; (4) extracts the mandrel (if employed); (5) opens the clamp; (6) releases pressure on the die; (7) returns the arm; (8) advances the mandrel to work position; and (9) indexes the work to the next angle of bend. The adjustable hydraulic clamps and variable speed control of the unit can be readily set to suit the size and composition of the work,

as well as other characteristics of the job.

The roller type pressure die feeds with, and provides a back support for, the work. Thus, roundness is maintained and scratching of polished stock is eliminated, it is claimed. Various mandrels may be employed when it is necessary to prevent wrinkling or deformation of the wall or small radius bends.

Inherent adjustment features of the machine provide a rapid positive means for setting up the unit for each job and for controlling the accuracy of the bends in the finished product. Adjustment of the clamp and pressure dies to micrometer limits compensates for the variables encountered in handling different materials and wall thicknesses. A degree-of-bend selector is furnished when it is required to produce a quantity of pieces, each with two or more bends of different

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Break Off
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Work**

Broken Taps come out in a jiffy, when you start right . . . with a Walton Tap Extractor. Stock your tool crib today. Sizes No. 4 to 1½", 2, 3, or 4 flutes. Prices range from \$1.50 to \$2.20 for the popular sizes. Write for price list and descriptive folder No. 10.

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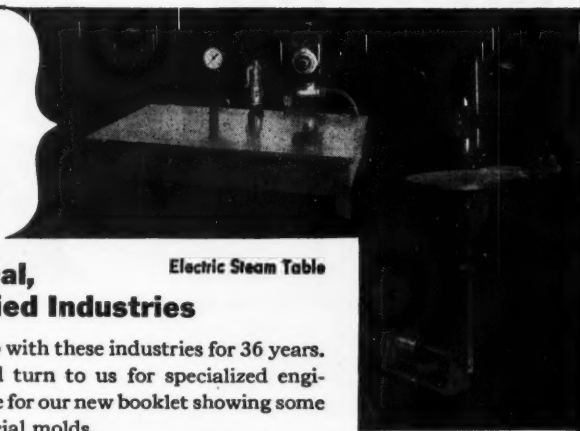
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We have been growing up with these industries for 36 years. Plants all over the world turn to us for specialized engineering knowledge. Write for our new booklet showing some of our machines and special molds.

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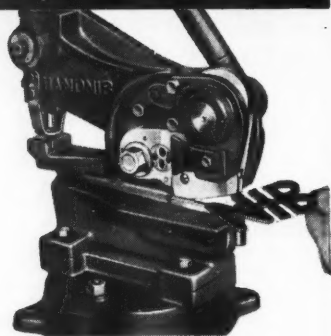
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OUTFITTERS TO PLASTIC MANUFACTURERS SINCE 1911

Specialists in designing and building Plastic Molds



THIS FIVE-IN-ONE TOOL IS
THE HANDY MAN
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- ROD CUTTER

● Imagine! One tool that can be used *five* different ways. This most versatile of the Heinrich line is Heavy Duty Handnib No. 5. It's a toolmaker's delight, for it eliminates hours of tedious hand-work in making templates and trial blanks of any shape desired. In addition to its nibbling (outside and inside) and shearing of steel up to 3/16" thick, the No. 5 Handnib punches up to 1/2" holes through 1/8" stock and cuts drill rods or round stock up to 3/8" diameter. Write today for folder giving full details on this and other Handnib models.

NATIONAL MACHINE TOOL CO.

DEPT. 117-L

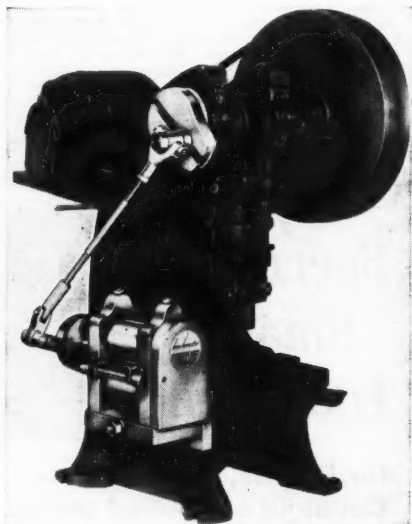
RACINE, WISCONSIN

angularity. The angle of each bend in the piece is thus automatically reproduced throughout the lot. For high speed production involving bends in more than one plane, adjustable plane-of-bend stops have been developed which control each bend in relation to others in the same unit.

The Pines Improved Bending Machine is available in standard sizes for handling up to 6-inch extra heavy pipe.

Benchmaster Automatic Friction Roll Feed

Designed for both old and new types of Benchmaster punch presses, as well as for a majority of standard punch



Benchmaster Automatic Friction Roll Feed

presses, an automatic friction roll feed which can be used with metal, wood, plastic, cardboard, and felt is now being marketed by the Benchmaster Manufacturing Co., 2952 W. Pico Blvd., Los Angeles 6, California.

The friction drive is geared down to provide a 0 to 3-inch adjustment in feed, with the unit designed to accommodate stock up to 3 inches in width. Adjustment for different thicknesses of stock from 0

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Cut Set-Up Time 75 %

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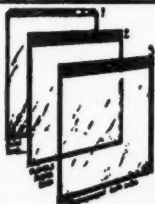
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*Give these
Advantages*

- Maximum possible strength • Maximum resistance to spread • Oversized, correctly located bearings of uniform diameter guarantee exceptionally long life • Applicable where a limit is placed on overall length • Applicable when minimum weight is a factor.

Atlas Universal Joints are made from selected heat treated Alloy steels and are engineered to be used to a maximum range of 45°.

In the West: Link Belt Co., Los Angeles, San Francisco, Portland, Seattle, Oakland, Spokane, Dallas.

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HARTFORD 5, CONN.

Adjustable MULTI-DRILL

for Production Drilling

9" DRILLING AREA

AVAILABLE WITH 2 TO 8 SPINDLES

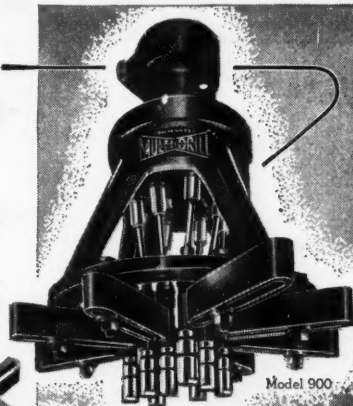
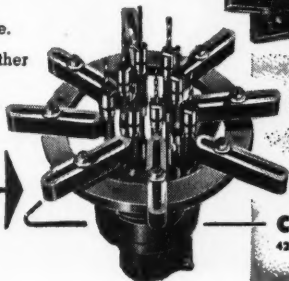
- Designed for accurate, high speed production drilling
- RUGGED CONSTRUCTION
- Quick, easy adjustments to any hole pattern on or within a 9" circle; 1/2" minimum center distances; Drill sizes 1/2" to 3/8"
- Special adaptations available.

MULTI-DRILLS are made in other sizes and models.

Write for details and name of your nearest Distributor.

Locator arms are designed for fast, easy adjustment

Dependable Performance...
proven by industry



Model 900

**FITS ANY
DRILL PRESS**

COMMANDER MFG. CO.

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to $\frac{1}{16}$ inch in thousandths of an inch is provided by a spring-loaded housing. The roll feed has a height adjustment of 0 to $2\frac{1}{4}$ inches and can be operated at maximum speed of 285 r.p.m. The rollers can be readily reversed from a forward to a backward motion in a matter of seconds, and the design of the unit includes a unique adjustable brake.

The Benchmaster Automatic Friction Roll Feed is constructed for easy installation with the aid of two bolts, thus enabling it to be quickly changed from the front to the side of the press. The rollers are $2\frac{1}{4}$ inches in diameter and are hardened and ground, as is the friction roll. Bronze bearings are provided to protect all wear points.

Cincinnati "Flamatic" Hardening Machine

The Cincinnati "Flamatic" Hardening Machine, a development employing flames for the surface hardening of parts in production quantities, has been announced by The Cincinnati Milling Machine Co., Cincinnati 9, Ohio. An outstanding feature of the machine is the

electronic temperature control system which permits the rapid heating of parts to the desired preset temperature, followed by an oil quench. It is claimed that the surface temperature at the instant the part enters the quench is held within plus or minus 5 deg. F. of the desired value in the critical transformation range.

Extremely fast and economical operation and adaptability to parts in a wide range of shapes and sizes are additional features claimed for the Cincinnati Flamatic Hardening Machine. Rapid heating enables the heat to be confined to the surface of the part, thus leaving the core relatively cool and permitting core properties to be established by previous heat treatment. Uniform depth of heat penetration is achieved, which factor, combined with the oil quench, results in negligible distortion.

Equipped with standards flame heads, the machine can be used to harden gears, shafts, barrel-type cams, pinions, and other parts that lend themselves to rotation. With special flame heads and work-holding fixtures, the machine can be made to accommodate a wider range of parts. In general, the range of parts which can be handled includes shafts up to 18 inches long and parts with diam-

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WIZARD TOOLRAK
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Introductory Offer \$1.00
as illustrated with 8 Basic Block Tool Holders.

- KEEPS TOOLS IN ORDER.
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A flexible tool rack to suit your present tool equipment and to accommodate ad-

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Engineered to meet the demand for screw thread parts production on high speed equipment.



These dies can be used not only in our own Floating and Releasing Type Holders but also in any Holder designed for dies of this type.

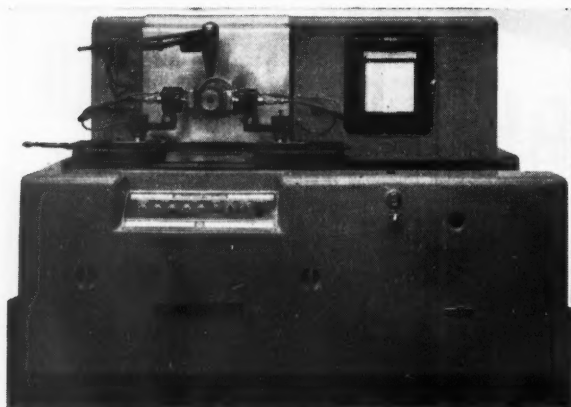
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Cincinnati Flamatic Hardening Machine with electronic temperature control for surface hardening of parts in production quantities

eters up to 8 inches, with correspondingly smaller lengths.

The Cincinnati Flamatic Hardening Machine is 7 feet 8½ inches wide x 5 feet 5 inches deep x 5 feet 6 inches high and weighs 8,500 lb. ready for operation. Basically, it consists of a work table built over a conveyORIZED quench tank, flame head assemblies adjustably mounted on

the work table, and a spindle to which a work-holding device is attached, centered between the flame heads.

Operation is fully automatic except for the loading of parts. The operator simply places the workpiece on the holding fixture, presses the automatic cycle start button, and the cycle is completed without further action by the operator.

The spindle starts rotating, the flames are ignited, and the surface of the part is heated to the preset temperature. At this moment, the flames are extinguished, the spindle stops rotating and retracts, stripping the workpiece off the holding fixture and into the quench tank. The operator can then place another part in position for the next cycle. Manual handling

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Choose **PRECISE 40** for 40,000 r.p.m. and 1/5 H.P. in an electric handtool weighing only 40 oz. *Built for production.* Mills, grinds, polishes, deburrs any material from file-hard steel to bronze, plastics, wood or rubber. With carbide cutters **PRECISE 40 mills** the hardest steel!



**1/5 H. P.
40,000 R. P. M.**

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PRECISE PRODUCTS COMPANY

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PRECISE 40

HANNIFIN

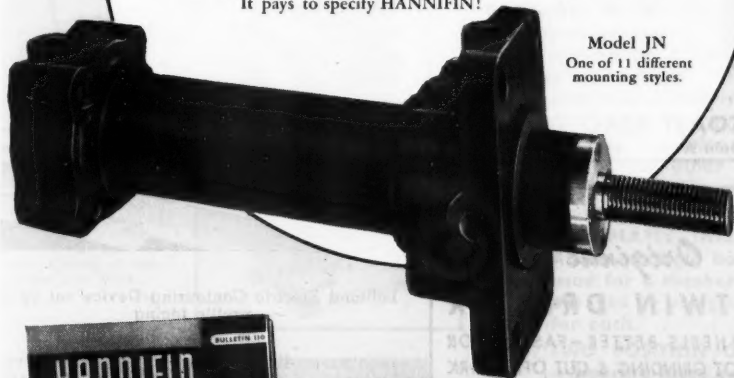
Another "SPECIAL" HYDRAULIC CYLINDER!

—out of the Standard Hannifin Line

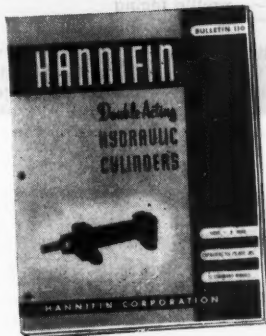
It's *special* because it's built to YOUR specifications! You can have any length stroke you want . . . a choice of mounting styles to meet your needs . . . bore diameter to fit the job . . . standard, double end, or heavy duty (2:1) piston rod . . . adjustable cushions . . . inlet ports on any side . . . air vents wherever needed — all "special" for YOU.

But it's *standard* with Hannifin because the Hannifin line of hydraulic cylinders is COMPLETE! For users of cylinders, this means lower engineering costs . . . quicker delivery . . . completely interchangeable parts . . . better design . . . superior performance.

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Model JN
One of 11 different
mounting styles.



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It's easy to get the right answer for even the most special jobs when you use Hannifin's new handbook on hydraulic cylinders. 52 pages of helpful specification and engineering data, complete with diagrams and dimensions.

Ask for Bulletin 110-I.



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PNEUMATIC PRESSES • HYDRAULIC RIVETERS • AIR CONTROL VALVES

of parts and operator fatigue are thus reduced to a minimum, and high productivity is maintained. A convenient push-button control panel affords the operator full command of the machine at all times.

The conveyor in the quench moves a preset distance at the beginning of each cycle, clearing a space to receive each piece and ensuring against damage to parts in the quench. Processed parts are delivered by the conveyor to a take-off plate at the end of the machine, where they may be collected or picked up by another conveyor.



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DRILL JIG BUSHINGS
 A.S.A. STANDARD
 Immediate Delivery
 on standard sizes
 Fast service on specials

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 THINS WHEELS BETTER—FASTER FOR
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**SAVES TIME—MONEY
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EVEN
 PRESSURE
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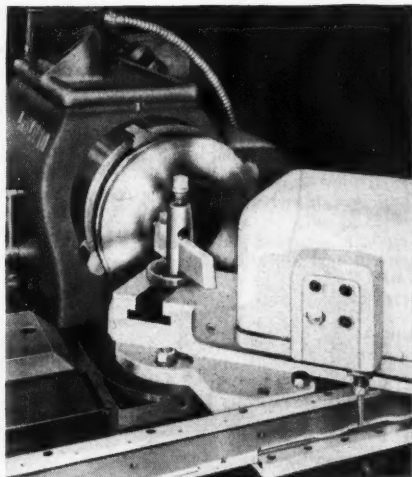


DRESSES
 WHEELS
 THINNER

STARN TOOL & MFG. CO.
 689 PEACH STREET
 MEADVILLE, PA.

LeBlond Electric Contouring Device

An electric contouring device which is said to duplicate work accurately, automatically, and quickly and which can be readily installed on any LeBlond Regal lathe has been introduced by The R. K. LeBlond Machine Tool Co., Dept. MMS, Cincinnati 8, Ohio. Designed for plugging



LeBlond Electric Contouring Device set up for profile facing

into an ordinary light socket, the device is claimed to perform accurately within 0.0015 to 0.002 inch the complete range of duplicating operations, including straight facing and turning; the duplication of tapers of any kind and shoulders; neck-



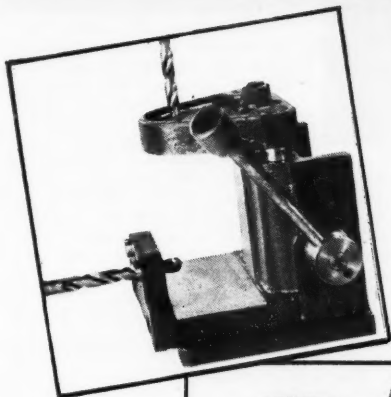
Spiral Flute
COUNTERSINKS

Aero Spiral flute Co-sinks end chatter, cut clean and accurately. Stocked in 60, 72, 82, 90, 100, 120 degree included angle, 1/4", 3/8", 1/2" diameter, with 1/4" shank and 3/4", and 1" dia. with 1/2" shank. Available from your Mill Supply dealer or direct.

AERO TOOL COMPANY
 229 WEST OLIVE • BURBANK, CALIF.

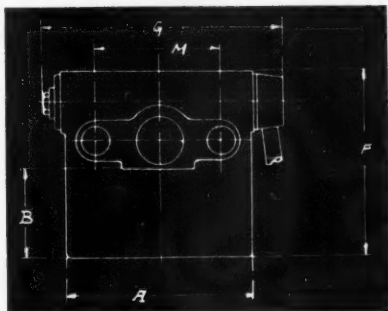
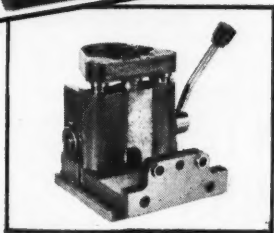
LIFT-SWING
PATENTED

Fixtures for DRILLING TAPPING - COUNTERBORING INSPECTION - at one setting



Lift-Swing in closed position.

Lift-Swing open — note absence of projection over work.



A—Range from $4\frac{1}{4}''$ to $8''$. B—Range from $2\frac{1}{4}''$ to $4''$. F—Range from $4\frac{3}{4}''$ to $7\frac{3}{4}''$. G—Range from $6''$ to $10\frac{1}{4}''$. M—Range from $2\frac{3}{8}''$ to $5\frac{7}{8}''$.

If you want economy, the **LIFT-SWING** combination Drill Jig and Work Holding Fixture will satisfy your most exacting demands, for these very good reasons:

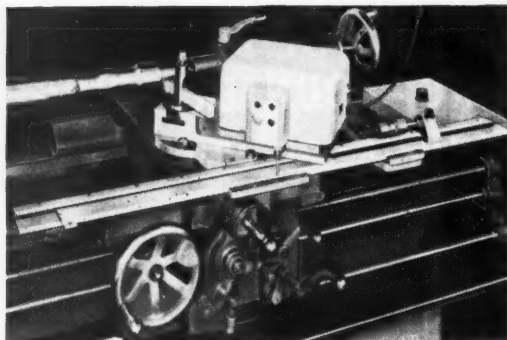
1. **DIE SET ACCURACY** — hardened and ground bushings—stationary guide and pilot pins maintain exact alignment at all times.
2. **TOP SWINGS ASIDE** — for loading and unloading — for performing other operations —for inspection of the work —without disturbing setting.
3. **TOP PLATES INTERCHANGEABLE**—a single base can be used for a number of different jobs by using a top plate for each.
4. **TWO POSITION OPERATION** —bearing faces permit drilling in two planes at right angles to each other.
5. **SIMPLE CAM LOCK** release and handle permit **FAST OPERATION**.
6. **COST** is much less than custom made jigs.
7. **11 Standard sizes.**

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**ACME TOOL
MANUFACTURING CO.**

50 PERRY STREET,
BELLEVILLE 9, N. J.

SEND FOR NAME OF NEAREST SUPPLY HOUSE



LeBlond Electric Contouring Device set up for duplicating work between centers

ing; and the duplication of concave and convex surfaces, as well as spherical surfaces. It is said to be readily adaptable to duplicating work between centers or profile facing.

By means of the duplicating slide, which can be swiveled on either side of the cross slide center line, the tool may be fed either toward the headstock or tailstock. A constant distance between the tool and template is maintained since the template bar is a part of the toolslide

and moves in and out with it. The diameter is thus controlled by the regular cross-feed screw.

Three electric push buttons for in, out, and automatic cycle simplify operation of the LeBlond Contouring Device, which is claimed to require no special skill for setting up or using. Since the unit may be quickly installed or removed, it does not interfere with the

normal operation of the lathe. In addition, the slide on which the duplicator is mounted is interchangeable with the standard Regal top slide. No machining, drilling, or fitting is required.

Sheffield Projectoform Grinder

The accompanying illustration shows the Sheffield Projectoform Grinder now being offered by The Sheffield Corp., Day-

SAVE HOURS of 'DOWN TIME' METCALF-DRESS YOUR GRINDING WHEELS

A minute with a Metcalf Wheel Dresser is time well spent—saves you hours of production time, too. The Metcalf quickly brings up short corners on thin wheels, trues up a square edge, or turns a bevel rapidly and accurately. No tearing of the wheel. Fast, efficient cutting action is assured by the three-fold Metcalf principle:

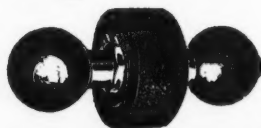
- ★ Cutting effect of one abrasive wheel upon another, when held at the proper angle.
- ★ Gyroscopic action caused by fast rotation.
- ★ The Inertia caused by the weight of the ball handles.

Low wheel-replacement cost means added savings and greater profits. Why not write us today for Bulletin M-117.

For Thin or Small Grinding Wheels



The Metcalf Minute Man says: "Spend a minute with me—save yourself hours of Production Time."

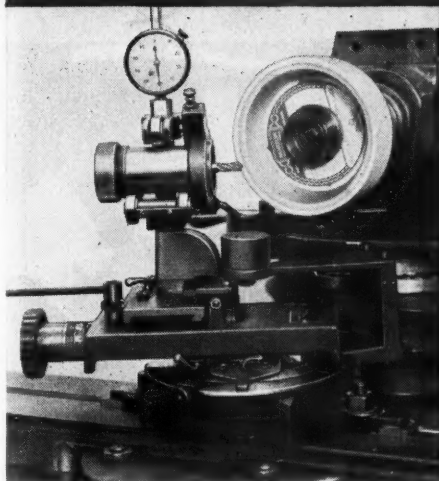


★ ELECTRIC BRAZERS
★ ANVILS AND HAMMERS
★ BAND WHEEL GRINDERS
★ MISCELLANEOUS SAW & KNIFE FITTING EQUIPMENT

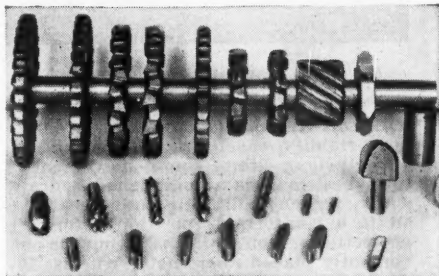
HANCHETT MANUFACTURING CO.
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BIG RAPIDS, MICHIGAN U.S.A.

★ SAW SHARPENERS
★ SAW STRETCHERS
★ KNIFE GRINDERS
★ SWAGES AND SHAPERS
★ WELDING CLAMPS

Radiform it the accurate way "Trial and Error" Method is Obsolete



PATENT PENDING



Here are a few standard cutting tools that have been ground on the Radiform into special forms.

Radii can now be formed on spiral fluted end mills and similar rotary cutting tools. You will see pictured at the left the Radiform forming a $3/16$ " convex radius on a $3/4$ " dia. end mill. This attachment on the Radiform with its 24 station indexing head will save you time and money, and give you precision results you had never hoped for.

The Radiform generates forms on most types of cutting tools. Carbide form tools are no longer difficult to grind with a Radiform.

New, reduced prices for the Radiform have just been released. So write today for revised price list and complete information showing examples of how the Radiform can simplify your complex expensive grinding operations.

A number of good territories are open to qualified distributors.

W. F. MEYERS COMPANY • ESTABLISHED 1888
1014 FOURTEENTH STREET • • • BEDFORD, INDIANA

ARTUS PLASTIC SHIM

AND FEELER GAUGE STOCK



The **COLOR**
tells the
THICKNESS

• Each thickness a distinctive, easy to identify color. Impervious to oil. Long lasting 5"x20" sheets. Special sizes to order. Handy assortment, shim stock, 12 colors—12 thicknesses (.001-.030). Bound together.....\$4.25

ARTUS ARBOR SPACERS



The **COLOR** tells
the **THICKNESS**

ARTUS Arbor Spacers made of plastic in various colors identify thickness at a glance! .001, .0015, .002, .003, .005, .0075, .010-.030. Speed up accurate fitting at low cost. Write for folder.

CONVENIENT TRIAL OFFER

Handy Spacer Assortment

10 ea.	.001 — .0125 thick
5 ea.	.015 — .030 thick

100 SPACERS IN ALL

1/8" — \$3.10	1 1/4" — \$3.80
1/4" — 3.35	1 1/2" — 4.70

Other standard sizes also available.

Illustrated Folder Free.

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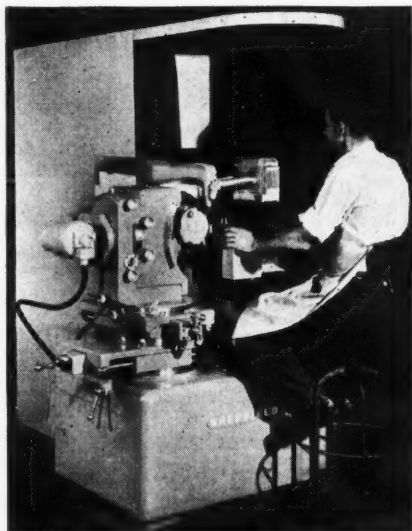
Gentlemen: Please send me:

- ☐ Handy Spacer Asst.
☐ Handy Shim Stock Asst.
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ton 1, Ohio. The machine incorporates an optical system utilizing either contour or opaque projection with surface illumination and 25-to-1 or 50-to-1 optional magnification. A prism included in the optical system places the image in a natural position with the work so that confusing opposites in movement of work and projection are avoided.

All moving ways of the Sheffield Projectoform Grinder are completely sealed



Sheffield Projectoform Grinder

with anti-friction bearings to ensure firmness, rigidity, ease of movement, and extremely long life. Remote movement of the wheel head is accomplished hydraulically, thereby allowing the operator to sit in a comfortable position before the projection screen while operating the conveniently placed micrometer wheels. The operator can see the work and wheel in natural colors highly amplified on the screen at all times.

Cross Straddle Facing Machine

A straddle type facing machine for facing the main bearings on Diesel engine cylinder blocks has been developed by The Cross Co., Detroit 7, Mich. The machine utilizes carbide-tipped tool bits, two



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H **HARGRAVE** **TESTED TOOLS**

THESE fine tools are truly tested . . . in the Hargrave plant and in service in the field. Hargrave Tested Tools are standard equipment in the nation's leading plants . . . the favorites of craftsmen since 1879.

WRITE FOR CATALOG SHOWING COMPLETE LINE

The **CINCINNATI TOOL Co.**

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There is an Industrial Distributor Stock Nearby.

WELDERS' CLAMP **No. 43**



The Hargrave No. 43 Welders' Clamp has a patented anti-spatter screw made of a solid alloy . . . permanently resists loading (not coated).



NEW CARRIAGE CLAMP **No. 530**



Made of a powerful new metal. Stronger than malleable iron clamps. Openings from 3" to 8".

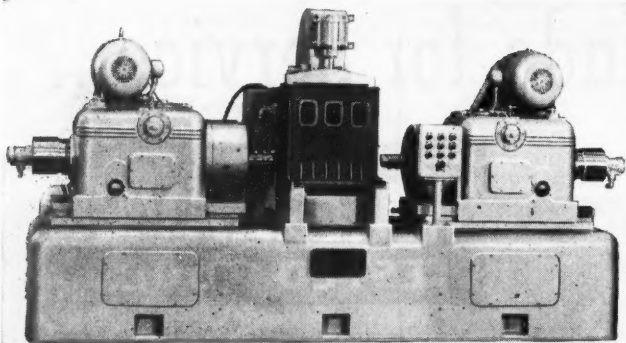
IMPROVED "1" BAR CLAMP (Patented)

Bar is high-carbon manganese steel, Slide, Tip, Frame and Crank are best grade of malleable. Openings from 2 to 10 feet.



CHISELS — PUNCHES

Forged from alloy steel in all standard sizes. Individually Tested.



Cross Straddle Facing Machine

of which are mounted in each toolholder.

In operation, the heads of the machine rapid advance into cutting position. The revolving bars carrying the tools then feed out at 0.012 inch per revolution for the roughing cut and then feed back again at 0.006 inch per revolution for finishing. Parts are locked and clamped by power and then machined automatically, with the operator simply pressing the control buttons.

According to the manufacturer, the de-

sign of the Cross Straddle Facing Machine reduces maintenance and set-up time to a minimum and provides for long tool life. Moreover, the machine is claimed to ensure the production of a high quality finish on work as well as the

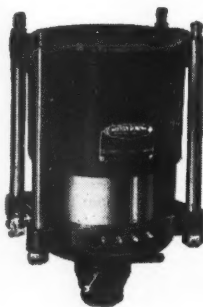
production of parallel faces, square to the main bearing bores. The unit is said to have a production rate of 41 cylinder blocks net per hour.

Sibley Model C-20 Drilling Machine

Designated as the Model C-20, a 20-inch swing high speed drilling and tapping

DIE CUSHIONS THAT MODERNIZE YOUR DIE CONSTRUCTION AND DESIGN

Adaptable to All Deep Drawing Press Operations



Cushion Size.....	5"	6"	8"	10"	12"	14"	16"
Maximum Draw.....	2"	2½"	3"	3"	3"	4"	5"
Maximum Tonnage.....	9	1.4	2.5	3.9	5.7	7.7	10.0

A cushion model and size for every press requirement.

Die cushions with hardened and ground pin pressure pad which can be used to an advantage on all pressure pad controls on a large percentage of your forming dies.

WRITE FOR CATALOG

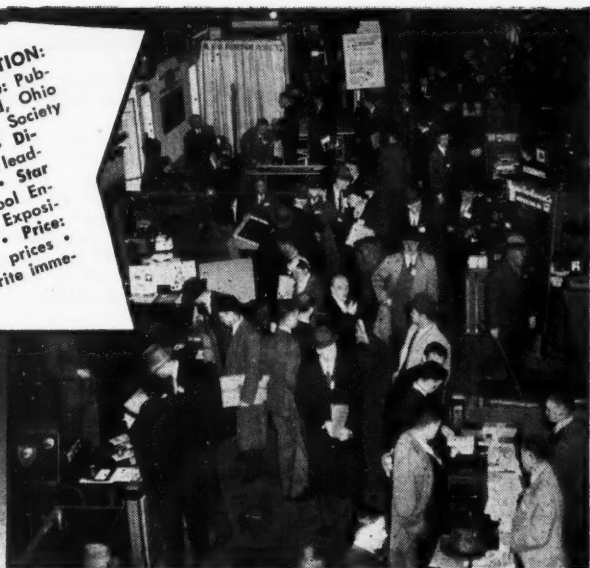
No. 100-12

DAYTON ROGERS
Manufacturing Company

MINNEAPOLIS 7, MINNESOTA

BOX OFFICE INFORMATION:
 Time: March 15-19 • Place: Public Auditorium, Cleveland, Ohio
 Produced by: American Society of Tool Engineers • Directed by: America's leading industrialists • Star performers: All Tool Engineer exhibitors • Price: No advance in prices • Reservation: Write immediately.

Command Performance



The "Standing Room Only" sign was out at the last Tool Engineers' Exposition. Get your reservation in early!

... that commands attendance!

The curtain's rising on ways and means to aid tool engineers and industrial engineers in their drive for greater production.

Next March the American Society of Tool Engineers will present in Cleveland the most spectacular Tool Engineers' Industrial Exposition ever held!

The latest developments in tools, machines and industrial equipment for the world's vitally needed increased production will be presented at this Exposition.

New and different products and methods, technical sessions, plant tours and industrial movies all add up to a more business-producing Exposition than ever before.

Fifth row center for a star-packed performance! The men who dictate what shall be bought, and from whom, are the self-same men who attend the Tool Engineers' Industrial Exposition again and again.

Thousands of these "men who count" attended the last Exposition and every one of them was connected directly with manufacturing, or was an industrial and tool engineer, hunting (and finding) better ways to do his job.

Extra Added Attraction: Coincidental with the Exposition, ASTE members will meet for their 16th Annual Convention in Cleveland. It's your big chance to sell the tool engineer . . . so make it a date for '48!

For complete information write the

EXPOSITION COMMITTEE

**AMERICAN SOCIETY
OF TOOL ENGINEERS**

1666 PENOBSCOT BLDG.
DETROIT 26, MICHIGAN

USE THE RIGHT BLADE for every job

now you see at a glance

Which Blade To Use How Best To Use It

Printed attractively in two colors this Victor chart tells at a glance exactly which hand, band, or power blade to use on any material. It gives money-saving, work-speeding suggestions on the proper use and care of blades.

Write on your letterhead today for your free Victor wall chart and hang it near the tool crib or in your machine shop for ready reference. It's absolutely free.

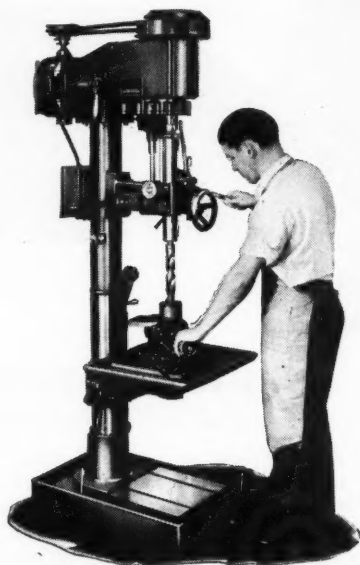
Turn to your Victor supplier, too, for better-cutting, longer-lasting blades. He has a Victor blade for every job a hack saw or band saw can do—one that you can rely on to give you fast, clean cuts on metals, plastics and other non-metallics.

3375

VICTOR SAW WORKS, INC.
MIDDLETOWN, N. Y., U. S. A.
Makers of Hand and Power Hack Saw Blades, Holes and Band Saw Blades

machine is announced by the Sibley Machine & Foundry Corp., Dept. MMS, South Bend, Ind. Designed as a precision tool for sensitive drilling and tapping operations at high speeds, the machine is sturdily constructed and is equipped with a 2 h.p. motor which is said to provide ample power for drilling holes up to 1½ inches in diameter in mild steel.

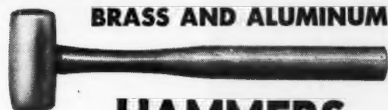
The controls of the machine are conveniently arranged for quick operation. The selection of geared power feeds is made by simply turning a knob. Speeds can be quickly changed by a positive release lever. In back gears the machine



Sibley Model C-20 Drilling Machine

provides spindle speeds of 65, 95, 150, and 225 r.p.m. In direct drive, it provides speeds of 400, 575, 900, and 1,360 r.p.m. Three feeds of 0.003, 0.006, and 0.010 inch are available.

To provide for accuracy and speed, the Sibley Model C-20 Drilling Machine incorporates a drive mechanism having a double ball bearing spindle assembly, with the spindle precision ground. Accurate alignment of the table arm with the spindle is said to be assured by boring the table arm after assembly with the spindle of the machine. A rectangular oil groove table is furnished as standard equipment.



BRASS AND ALUMINUM

HAMMERS

HEADS—SAND MOLD CASTING

HANDLES—13" to 14"—

AR Grade Hickory

BRASS Hammers

Good Grade Yellow Brass

16 oz.	\$10.80 per dozen
24 oz.	14.40 per dozen
32 oz.	16.80 per dozen

ALUMINUM Hammers

5 1/2 oz.	\$ 7.80 per dozen
8 oz.	9.60 per dozen
10 1/2 oz.	10.80 per dozen

Prices f.o.b.

Let us give you our prices on your Aluminum, Brass or Bronze castings.

Jobbers: Send for our Machinist Hammer catalog pages and discounts.

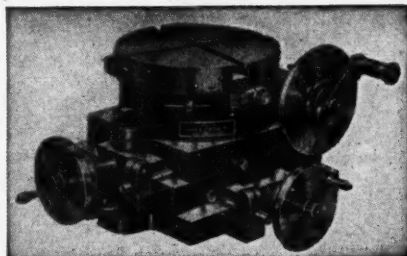
KLOPPENBORG ALUMINUM FOUNDRY

Dept. MM117,

211 Marquette St., Davenport, Iowa

No. 1 COMPOUND TABLE

With 7 1/2" Dial Type Rotary Table Mounted



We also make a No. 2 Size for 12" Rotary Table. Can be had without Rotary Table.

Write for Bulletin.

Rotary Tables • Multiple Spindle Index Centers • Vises • Screw Machines • Screw Head Slaters.

John B. Stevens Inc.

482 Canal St. New York 13, N. Y.



KOCH Test Indicator

Two working ends—one to test outside surfaces, the other inside. For precision work and toolmakers' use.

Plunger moves away from, instead of against the lever, protecting delicate parts from sudden or excessive jolts. Each graduation on scale represents 1/1000" movement of plunger. \$6.50.

Positive - Lock SURFACE GAGE

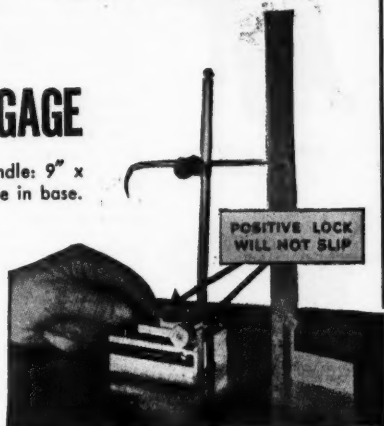
Drawbolt has positive lock to prevent slippage. Spindle: 9" x 5/16". Block: 3 1/4" x 2 1/2" x 1" with 90° angle groove in base. \$6.00.

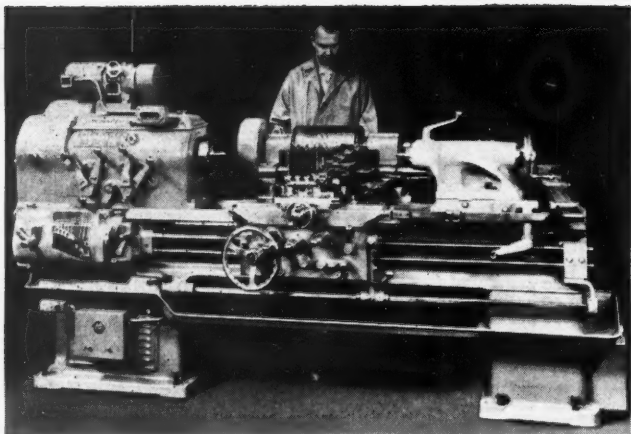
Dealers wanted to sell these tools. If no dealer write for circulars on the Koch Test Indicator and the new toolmaker's surface gage.

ANDREW GENALES

28 SECOND AVENUE, NYACK, N. Y.

Tel. NYack 2222





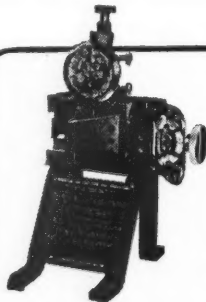
Monarch Engraving Lathe

Monarch Engraving Lathe

According to The Monarch Machine Tool Co., Sidney, Ohio, the Monarch Engraving Lathe shown herewith is designed to reduce time-consuming hand engraving to the speed and repetitive accuracy of tool operation. Not only is the

machine claimed to turn intricate shapes and designs which have heretofore been produced only by hand engraving but it is also said to perform all of the operations which may be handled on the standard Monarch Shapemaster Lathe.

The Monarch Engraving Lathe is constructed to machine parts with almost any continually changing shape which may vary constantly both around the circumference of the workpiece and from one end to the other, since the turning tool passes along the work and may be given a definite position for every degree of rotation or fraction thereof and for every thousandth of feed. The master



CLARKATOR CHECKS DIAL INDICATORS



MASTER DIAMOND CHECKING SET

CLARK

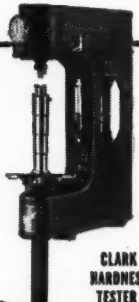
Gives Continued Accuracy, Rapid Measurements

THE CLARK has everything you want in a hardness tester—direct reading precision dial, durable construction, ease of servicing. Three standard models shipped complete with weights, dust protectors, diamond and steel penetrators, test blocks, and anvils.

CLARKATOR CHECKS DIAL INDICATORS with micrometer speed and sine bar accuracy. Easy to operate—just four simple steps. Complete instructions permanently fastened to base.

MASTER DIAMOND CHECKING SET eliminates hardness tester errors. Consists of a master diamond penetrator and two test blocks. Precision is assured over a long period because the set is used only for checking. Furnished in leather case.

Learn the truth about hardness testing! This 20-page reference manual (right) contains information on history, theory, practice, and equipment for modern hardness testing. Available to executives without charge. Write Dept. MMS today!



CLARK HARDNESS TESTER



CLARK INSTRUMENT, INC.

10200 Ford Road.

• Dearborn, Mich.

record shape may be transmitted to the work same size or at any ratio of reduction, thus allowing for the economical production of intricately-shaped molds of the same design in a variety of sizes. Moreover, the machine can be used to transmit the master record shape of the circumference of the work only once or to repeat the shape as many times as desired.

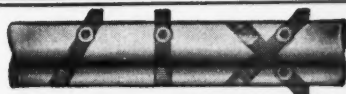
The Monarch Engraving Lathe is said to produce its own master record from the original hand-worked model. This original model is in the form of a cylinder and is always smaller than the master record cylinder. For the turning of its own master record, the model is mounted in a conventional work-holding chuck. As the original model is rotated, a sharp point follower in contact with it pantographs the design to a small milling cutter at the rear of the lathe carriage. This milling cutter is set at an angle and accurately forms the original model design on the rotating master record. Upon completion of the master record, a small roller is substituted for the milling cutter, and a sharp point cutting tool in the tool post of the machine takes the place of the previously used sharp point follower. The workpiece to be turned is chucked, the master record is rotated, and the de-

sign thereon is pantographed to the cutting tool.

The Monarch Engraving Lathe has a swing over the bed of $20\frac{1}{2}$ inches and distance between centers of 48 inches. The maximum diameter swing between centers is $4\frac{1}{4}$ inches; the maximum diameter which can be engraved is 15 inches, while the maximum length of the workpiece which can be engraved at one setting is 9 inches. The engraving slide has a maximum stroke of 1 inch.

Dayton Rogers Model HJ Hydraulic Overload Jack and Connecting Rod

Identified as the Model HJ, a hydraulic overload jack and connecting rod intended primarily for large single and double-crank straight-side punch presses is announced by the Dayton Rogers Manufacturing Co., 2835 12th Ave. S., Minneapolis 7, Minn. Said to definitely avoid all press overload and to eliminate damage to the punch press crank and frame, the overload jack merely supplies a connecting link between the crank bearing and ram, with the jack calibrated at the



A BETTER BORING BAR

OUR fine list of Customers is PROOF that our method of broaching square holes makes a better fit for the tool bit. This means more rigidity and longer life especially with tungsten Carbide. We also make bars for our Type B and Type C cutters or a combination of tool bits and cutters. Bars are made to suit customers' requirements as to method of drive, pilot, number of holes, angle of bit, etc. Our two-bladed cutters can be floated in the bar or held rigidly. Cutters are interchangeable—hence can be ground in an arbor in the tool room and only require a few seconds for inserting in the bar.

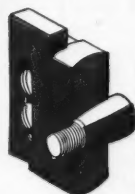
Square hole sizes range from $\frac{1}{4}$ " up to and including $\frac{3}{4}$ ".

THE DETROIT BORING BAR CO.
688 E. FORT ST. Detroit 26, Mich.



TYPE "B" AND "C" CUTTERS

Suitable for Tipping With Tungsten Carbide



"B" A strong rigid serrated 2-bladed cutter—located in the bar with a taper pin. Bores holes accurately to close limits. Can be expanded and reground giving long life. Sizes $\frac{1}{8}$ " dia. up to 6".



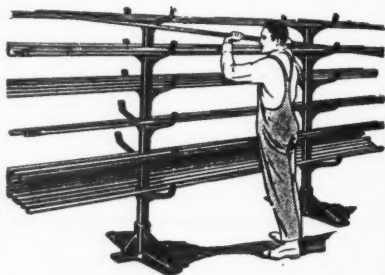
"C" A simple 2-bladed reaming cutter. Can be expanded and reground. Located in the bar by a hardened V. This V never has to be reground as blades are expanded.

Fits other bars with slots
 $\frac{1}{8}$ " x $\frac{1}{8}$ "
 $\frac{1}{4}$ " x 1"
 $\frac{3}{8}$ " x $1\frac{1}{4}$ "
 $\frac{1}{2}$ " x $1\frac{1}{2}$ "





Each BROWN SECTIONAL RACK combines five major and several minor features of design, all of which save money for its owner. The time previously lost in end-hauling each bar of stock its entire length from the old-style, closed-side Rack is saved by the Brown Rack which requires but a few inches of side movement.



Each length, width and thickness of stock is displayed in Gold-Fish visibility for instant selection and workmen waiting for stock are served without waste of time. The BROWN SECTIONAL RACK is a simple, durable article built in five styles from standard inter-locking metal sections. It cannot burn, sag or twist; unattached to the building, it can be moved at will. Changes in length of stock can be met by moving the units nearer or further apart, while increases of stock can be met by simply adding more standard units. Built from metal thruout, depreciation is practically nil. SEND FOR BULLETIN 26-M.

BROWN SECTIONAL RACK

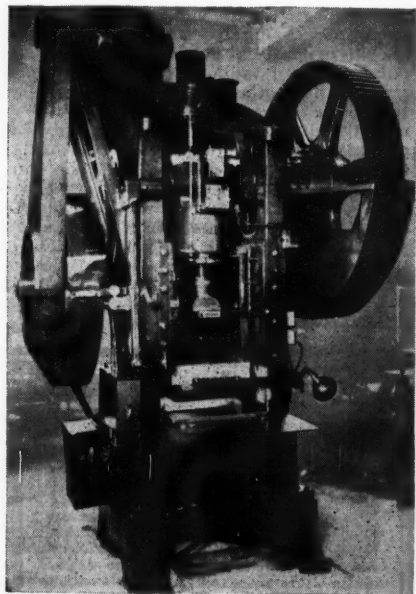
BROWN ENGINEERING CO.

120 N. THIRD ST. READING, PA.

RACKS • VISES • CLUTCHES • COUPLINGS

maximum tonnage of the press to afford the operator the desired press protection. It may be so calibrated as to protect a given working operation or group of tools used in the press.

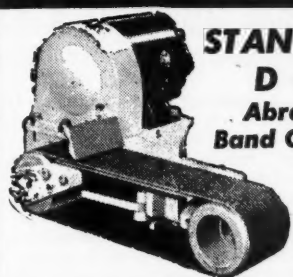
The dribble pump furnished is actuated from a cam on the throw of the press and is said to maintain a constant pre-loaded pressure on the hydraulic jack cylinder, thus assuring a constant predetermined pressure at all times at the point of operation. In the event the press is overloaded beyond the predetermined pressure set on the hydraulic jack, the



Press Equipped with Dayton Rogers Model HJ Hydraulic Overload Jack and Connecting Rod

entire jack mechanism telescopes, thereby allowing the press to continue throughout the work cycle of the press crank and thus providing the operation the desired protection. The original setting is obtained by either a power pump or manually-operated pump which is operated to the desired working pressure set by the calibrated overload valve.

The Dayton Rogers Model HJ Hydraulic Overload Jack and Connecting Rod is built in sizes with from 50 to 500-ton working capacity.



**STANDARD
D - 4
Abrasive
Band Grinder**

Famous
for
Stamina

This new, streamlined bench type grinder assures fast, quality finishing on metals, plastics, wood, fibre . . . at low cost. Built to machine tool specifications, Standard D-4 is equipped with improved band tension control and specially designed protective motor hood. 4x36 1/4" band. The ideal portable unit.

OTHER STYLES AND SIZES IN NEW
MANUAL ON FINISHING—WRITE TODAY

WALLS SALES CORP.

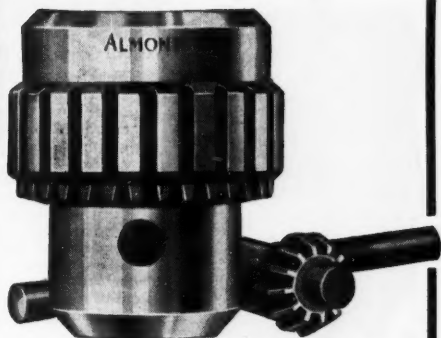
306 E. 38th St., New York 16, N. Y.

Almond
**DRILL
CHUCKS**

• The Almond Three Jaw Drill Chucks were the first to be placed on the market. They were Pioneers in the field of Drill Chucks!

ALMOND THREE JAW DRILL CHUCKS are furnished in 9 sizes with capacities from 3/16" to 1". These are made in heavy and light duty types with a taper arbor hole or with a threaded arbor hole. For Portable Drills.

Write for Complete Details



T. R. ALMOND MFG. CO.

ASHBURNHAM

MASSACHUSETTS

**Why Use A Shaper
to cut Keyways when a**

**DAVIS
KEYSEATER**

**will do the
job so much
quicker
and
better?**

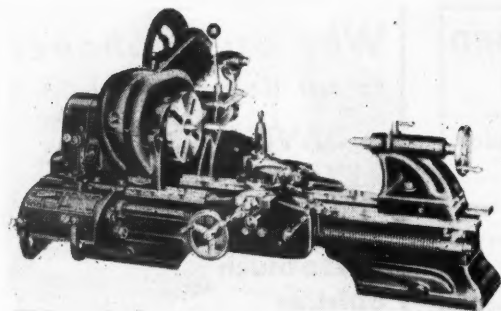
Send
for
Circular



DAVIS KEYSEATER CO.

Exchange and Glasgow Sts.
ROCHESTER, N. Y.

• • SINCE 1872 • •



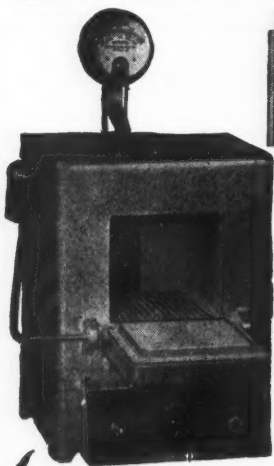
Atlas 10-Inch Quick-Change Lathe

Production of a 10-inch lathe featuring a quick-change mechanism that provides for instant finger-tip selection of 54 threads and feeds is announced by the Atlas Press Co., 2346 N. Pitcher St., Kalamazoo 13D, Mich. Forty-five threads and feeds are obtained by merely shifting two levers on the gearbox and an additional nine by changing the position of a sliding gear. A convenient tumbler gear lever is used to reverse gears or disengage them from the lead screw.

According to the manufacturer, the quick-change mechanism does not in any way limit the odd thread and feed range and capacity of the lathe. By varying the gear train with change gears (available) hundreds of additional threads and feeds are obtained for jobs such as metric threading, coil and wire winding, and special tooling. Additional features of the machine include Timken tapered roller

bearings, precision ground bed, 16 spindle speeds, back gears for extra power, instantly reversible power cross and longitudinal feeds, and rapid-change counter-shaft.

Designed for operation by a $\frac{1}{3}$ or $\frac{1}{2}$ h.p. 1,725 r.p.m. motor, the Atlas 10-Inch Quick-Change Lathe is available in two bed lengths having a capacity of 24 and 36 inches between centers. The lathe has a swing over the bed of $10\frac{1}{4}$ inches and over the carriage of 6 $\frac{1}{2}$ inches and is provided with 16 spindle speeds between 28



NEW TEMCO MODEL C E A

ELECTRIC FURNACE

The new MODEL C E A has been designed to give superior performance, with ease and economy of operation, at a low initial cost. It will stand hard use and is an ideal furnace for general laboratory purposes, heat-treating and small unit production.

SPECIFICATIONS

Temperature Control — Any temperature from 500° F. to 2000° F. can be selected and automatically maintained with the TEMCO variable temperature control.

Pyrometer — Indicating type calibrated in both Fahrenheit and Centigrade scales.

Dimensions—Inside $4\frac{3}{4}$ " wide, $4\frac{1}{4}$ " high, 6" deep. Outside 12" wide, $15\frac{1}{2}$ " high, $14\frac{1}{2}$ " deep.

Prices Model CEA Complete
For 115V.—A.C. only....\$80.00
For 115V.—A.C. & D.C. 85.00
For 230V.—A.C. only.... 85.00

- Heats up to 1500° F. in 30 minutes.
- Can be operated continuously up to 2000° F.
- Embedded heating element protected against damage and chemical deterioration. Muffle core easily replaceable.

- Heating element, special high temperature alloy, completely surrounds heating chamber assuring the most uniform distribution of heat.
- Insulated with highly efficient, lightweight materials cast permanently into furnace body.

Write for full information and name of nearest distributor.
THERMO ELECTRIC MFG. CO., 488 W. Locust St., Dubuque, Ia.

T. H. LEWTHWAITE MACHINE CO.



METAL LATHERS' BENDER

This machine will bend up to $\frac{1}{2}$ " square or round iron, $2" \times \frac{1}{2}"$ channel iron, $2\frac{1}{4}" \times 5/16"$ flat iron cold. Weight 40 lbs.

Circular on Request

317 EAST 47TH ST. NEW YORK CITY
PLaza 8-0380



DRILL THESE HOLES

BY A QUICK, EASY, INEXPENSIVE METHOD

Your business letterhead will bring literature.

WATTS BROS. TOOL WORKS
Wilmerding, Pa.

UTICA TOOLS

FOR MORE TOOL MILEAGE



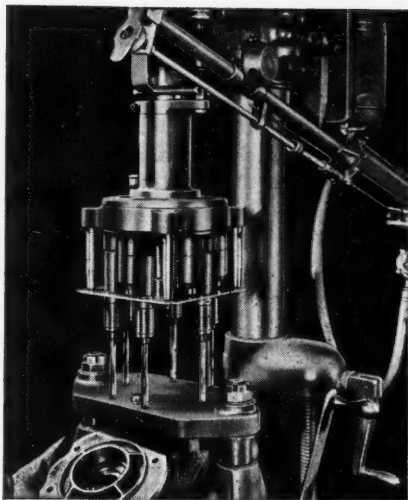
Pliers for every need



Long Chain Nose
Side Cutting Pliers
No. 654-6"

UTICA

DROP FORGE and TOOL
CORPORATION
UTICA 4, N.Y.



Precision Set-Ups That "Stay Put" for

HIGH VOLUME, MULTIPLE
DRILLING AND TAPPING

The Quick-Change Adjustable, Multiple Drill Head

is designed for long-run, multiple drilling and tapping operations. Illustration shows six holes for a bolt circle being drilled in a cast iron bearing plate. Six different bearing plates are drilled with this head at Wisconsin Motor Corp.

Each bolt circle pattern has its own set of spindle positioning plates. Spindle locked into position; cannot shift. Each spindle can be located anywhere within a $3\frac{3}{4}"$ circle, and all circles overlap.

Standard models available with 2 to 6 spindles. Models with more than six spindles built to order.

Write for Illustrated Bulletin

STRUTZ & MEAD, Inc.

DISTRIBUTORS FOR
WISCONSIN DRILL HEAD CO.

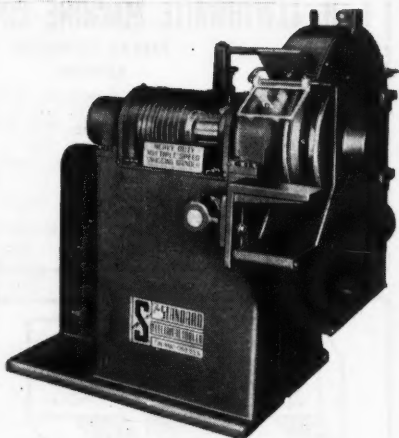
1227 N. Water Street, Milwaukee 2, Wisconsin

and 2,072 r.p.m. and a thread cutting range, right and left, of 4 to 240 per inch.

Standard Multiple Speed Snagging Grinder

The Standard Electrical Tool Co., 2487 River Rd., Cincinnati 4, Ohio, has developed a single-end multiple speed snagging grinder which is available for either right or left-hand operation, for vitrified or resinoid bond wheels, and in sizes for wheels ranging from 10 to 30 inches.

The accompanying illustration shows a 24-inch two-speed 10 h.p. model arranged for 24-inch diameter x 3-inch face x 12-inch bore grinding wheels. An interlocking speed control prevents overspeeding of the grinding wheel. The safety hinged door guard is of boiler plate steel with adjustment to compensate for wheel wear. Equipment includes an exhaust outlet, adjustable spark breaker, and safety glass eye shield. The working surface of the work rest measures 4 x 9 inches. The ball bearings of the unit are fully protected and mounted in liberal size oil reservoirs with sight feed oil gage on each bearing housing. A shaft lock is provided for use in changing wheels.



Standard Multiple Speed Snagging Grinder

The phantom cover illustrates the two-step speed arrangement, interlocking speed control, and heavy duty grinding spindle of the machine.

At Last!

THE AUTOMATIC ANGLE TANGENT TO RADIUS DRESSER



Patented.
Other Patents
Pending

MODEL
P-1

That Eliminates the Breaks in the Profile at the Points of Tangency.

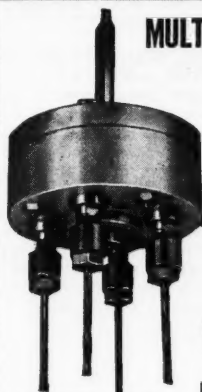
**NO TEMPLATES! NO ROLLS REQUIRED!
Three Simple Adjustments and
It's Set-Up.**

The Jeon Dresser will dress a radius (within .0001") either concave or convex, with angles absolutely tangent (to a split second) on either or both sides of the arc, IN ONE CONTINUOUS OPERATION. Also, any combination of angles or arcs and arcs.

**Write for Prices and Folder Describing
Its 20 Outstanding Features
Manufacturers' Representatives Wanted**

JEON MANUFACTURING COMPANY

Post Office Box 6750
Washington 20, D. C.



MULTIPLE DRILLING HEADS

(Fixed-Center or Adjustable)

MULTIPLE TAPPING HEADS

CLUTCH OR CONE-DRIVE TAPPING CHUCKS

OPENING STUD-SETTERS

QUICK-CHANGE DRILLING, TAPPING AND STUD-SETTING ATTACHMENTS

POSITIVE, FRICTION, INTER-CHANGEABLE TAP-HOLDERS

Automatic Opening Die Heads

Established 1891

ERRINGTON MECHANICAL LAB.

Main Office and Works:

STATEN ISLAND 4, NEW YORK

DIAMONDS
FOR WHEEL DRESSING TOOLS

DIAMONDS
FOR THREAD GRINDING TOOLS

DIAMONDS
FOR ALL INDUSTRIAL PURPOSES

KOEBEL

KOEBEL DIAMOND TOOL CO.
9456 Grinnell Avenue, Detroit 13

Buy KIPP AIR GRINDERS Because

The RPM's stay up while grinding ... not only when the grinder runs idle.

It is an established fact that surface speeds must stay up to approximately a mile a minute if you want to grind — not just rub. The speed of Kipp air grinders drops but slightly when put to work. That means better work—longer wheel life.

Buy Kipp air tools for best results, lower prices.

MODEL JA
50,000 R.P.M.

\$33²⁵

IN U.S.A.

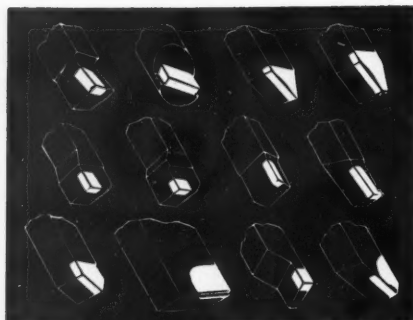


Weight 12 ounces;
length 6 3/4 inches;
chuck size 1/8 inch.
Wheel guard removed for better illustration.

MADISON-KIPP CORP.

208 Waubesa St., Madison, Wis., U.S.A.

- Skilled in DIE CASTING Mechanics
- Experienced in LUBRICATION Engineering
- Originators of Really High Speed AIR TOOLS



**FOR
COST
CUTTING...**

Wendt-Sonis
Standard Carbide Tools are
available in a
wide variety of
types and sizes.

**...ON
CUTTING
JOBS**

- 13 standard Wendt-Sonis carbide tipped tools will perform over 80% of your tool bit operations.
- Wendt-Sonis standard tool bits can be supplied with any grade of carbide required.
- Standard Wendt-Sonis tool bits are stocked in Carboly and Kennametal grades of carbide.
- Nationwide organization of established W-S distributors stocks complete line.

W-S standard tool bits are "Color Marked" for easy identification as to use on steel or non-ferrous materials. All shanks are rust resistant. Cutting edges diamond ground for longer wear and better finish. Use W-S carbide tools to increase your production . . . combat rising costs!

Free! NEW CHIP-BREAKER CHART

To get FREE chart WRITE: Wendt-Sonis Company, Hannibal, Missouri or 580 N. Prairie Ave., Hawthorne, California; also Wendt-Sonis Chicago Warehouse, 1361 West Lake St., Chicago, Illinois.

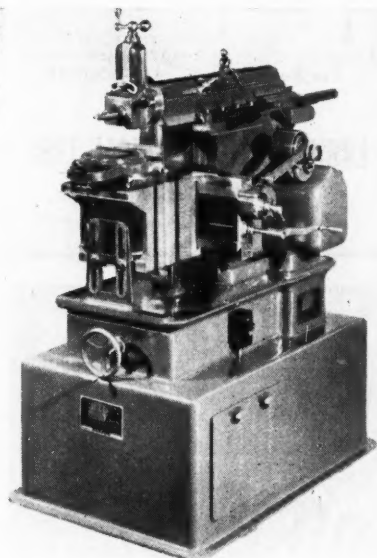
WENDT-SONIS

CARBIDE CUTTING TOOLS
BORING TOOLS • CENTERS • COUNTERBORES • SPOTFACERS
CUT OFF TOOLS • DRILLS • END MILLS • FLY CUTTERS
TOOL BITS • MILLING CUTTERS • REAMERS • ROLLER
TURNING TOOLS • SPECIAL BITS

Sheldon-Vernon No. 8000 12-Inch Shaper

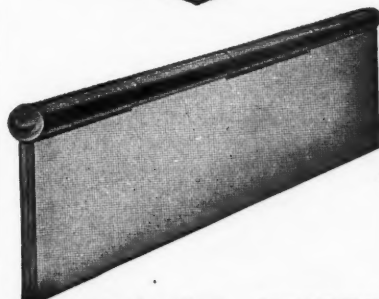
Designed to fill the gap between the large, heavy industrial shapers and the small bench type machines, a 12-inch precision shaper designated as the No. 8000 has been added to the line of Sheldon-Vernon equipment offered by the Sheldon Machine Co., Inc., 4250 N. Knox Ave., Chicago 41, Ill. The streamlined pedestal of the machine fully encloses a variable speed motor drive which provides speeds of from 12 to 180 strokes per minute at the turn of a handwheel.

The Sheldon-Vernon No. 8000 Shaper is provided with automatic cross feeds in



Sheldon-Vernon No. 8000 12-Inch Shaper

both directions of from 0.0025 to 0.0175 inch, and is furnished with a swivel table and swivel vise as standard equipment. All controls of the unit are conveniently located within easy reach of the operating position, thus making the shaper easy to operate. Moreover, the heavy cross rail, large dovetails, broad ways, and extra overhang of the ram are claimed to provide for the maintenance of accuracy over long periods of use, as well as for unusually long machine life.



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demand it . . .**

PROPER WORKING EQUIPMENT

WHILE only nature can help the little miss, Thriftmaster Multiple Spindle Drillheads are designed to accelerate your production.

Standard adjustable heads are made with 2, 3 or 4 spindles. Three-and-four-spindle types, as illustrated, drill in a circular pattern. Three-spindle heads are also furnished for drilling equidistant on a straight line.

In all Thriftmaster Drillheads, power is transmitted from a fixed-center drive directly to the drill spindles by means of heavy, immersion-lubricated gears. All gears and rotating parts are of alloy-hardened, heat-treated steel for proper strength and wear characteristics and are ball bearing mounted to insure long life at maximum operating capacity. For information or recommendations write to: **ENGINEERING DEPARTMENT, THRIFTMASTER PRODUCTS CORP., 1048 N. PLUM ST., LANCASTER, PA.**

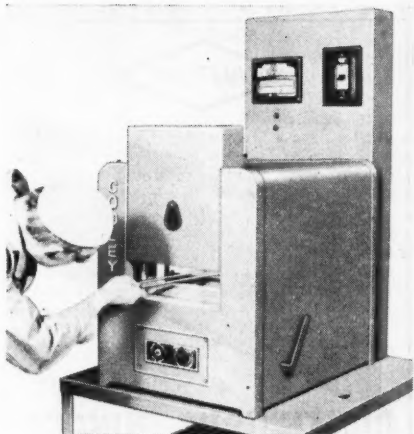


THRIFTMASTER *Multiple Spindle Drillheads*

Cooley Model VK-5 Electric Furnace

Said to be capable of continuous operation at 2,000 deg. F. and providing highly accurate temperature control down to 300 deg. F., the Cooley Model VK-5 Electric Furnace illustrated herewith is now being produced by the Cooley Electric Manufacturing Corp., Indianapolis, Ind. Suitable for heat treating small parts, tools, and dies, the furnace is said to heat from cold to 2,000 deg. F. in 1½ hours. Rapid and uniform heating of the 8 x 6 x 14-inch chamber is claimed to be assured by six imbedded-type heating elements, including one in the door. The power capacity is 4,650 watts. Since only 2½ kw. are required to maintain a temperature of 2,000 deg. F., ample capacity is available for heating whatever work is charged, the manufacturer states.

Designed to draw 20.2 amperes at 230 volts, the Model VK-5 furnace is equipped with a selective power modifier which, used in combination with an indicating-controlling pyrometer, permits the meeting of very critical temperature requirements. Power input may be adjusted to balance furnace heat losses, and low temperature overshooting of the pyrometer is said to be eliminated. Moreover, the modi-



Cooley Model VK-5 Electric Furnace

fier is claimed to prevent the furnace from heating to destructive temperatures in the event of pyrometer failure.

The modifier unit consists of a synchronous motor-driven cam-operated switch

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SPECIFICALLY FOR SHARPENING SMALL GAUGE & FRACTIONAL DRILLS



WHETHER you use drills singly or in gangs—by hundreds or thousands—this moderately priced machine—motor driven—will keep any supply sharp and quickly available.

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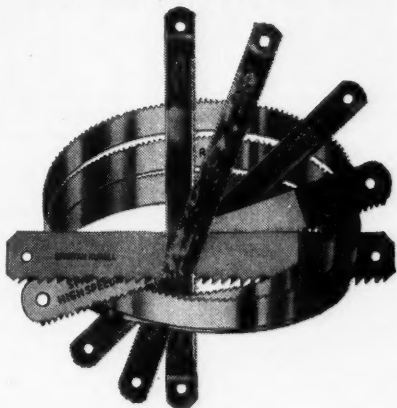
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The shops that are setting production records for fast, economical metal cutting are the shops that standardize on Spartan Blades and Tool Bits. The special Spartanized heat treating methods enable each to do its job at the lowest cost per cut. There is a Spartan Distributor in your Territory. See him today.

Spartan SAW WORKS INC.
SPRINGFIELD, MASSACHUSETTS

which can be selectively set to maintain the power from 5 to 100 per cent of capacity; a dial control; relay, and pilot light. All components are integrally mounted on the front panel below the furnace door.

Either a wall-mounted pyrometer or the illustrated control panel may be employed with the Model VK-5 furnace. Enclosed and self-contained, the latter is completely wired with a Taco West "Veritron" electronic - operated pyrometer, breaker-type switch, and fuses. When mounted with the panel and stand assembly, the furnace can be installed anywhere by connecting two line wires.

The Cooley Model VK-5 Electric Furnace is furnished with a counterweighted vertical lift door, thus making it possible to conserve heat where small pieces are frequently removed, since only a limited portion of the chamber need be exposed when charging or removing work. The counterweights and all mechanism are enclosed. The high maximum temperature of the Model VK-5 is said to make it well suited for the heat treating of stainless and air-hardening steels which have hardening temperatures well above those normally employed for heat treating alloy and carbon steels. It may be used efficiently for normalizing, annealing,

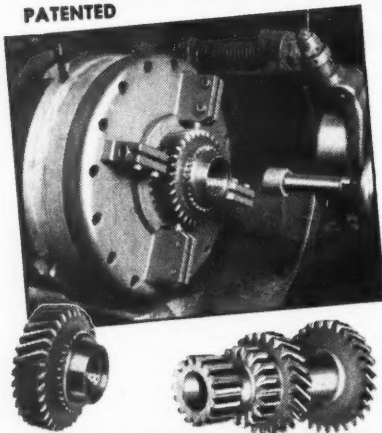
carburizing, and hardening in the range from 1,200 to 2,000 deg. F. At the same time, the unusually accurate regulation to a temperature as low as 300 deg. F. is said to make the furnace useful for tempering steel, heat treating non-ferrous metals such as aluminum and beryllium copper, and other low-temperature work requiring uniformly close control.

Ideal Synchronized Duplex Die and Punch Making Machine

Intended for watchmakers, jewelry manufacturers, instrumentmakers, and builders of special small dies, the Ideal Synchronized Duplex Die and Punch Making Machine illustrated herewith, product of the Ideal Tool & Die Co., Inc., 700 Congress St., Schenectady 3, N. Y., can be used with needle files and saws which are stretched to be rigid and taut by screw tension. Simultaneous stroking of both file-holding members above and below the die table is provided through a direct fully - enclosed connecting lever mechanism.

Features of the machine include an all ball bearing two-speed V-belt drive;

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DIAPHRAGM CHUCKS

Look, a high speed, precision chuck with no parts to wear out! Result: Maximum accuracy, minimum maintenance! Because the Woodworth design assures the ultimate in concentric chucking. Obviously, it will solve your precision chucking problems, as it has already for large manufacturers of gears and other production parts. Send your precision chucking problems to us—at no obligation.

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Write for circular.

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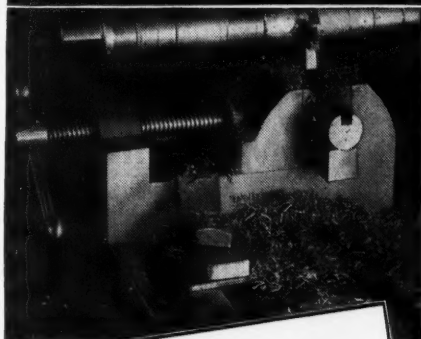
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Start-to-finish
work holding

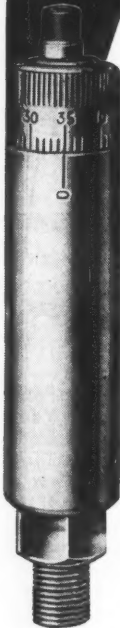
Take a job through every step without a misstep . . . faster, easier . . . in a "Yankee" Vise. Work lined up accurately from bench to drill press, to milling machine and back to bench. Lifts off and on a swivel base at the bench. Vise squared on top, bottom, sides and front end for machine work. Easily made into handy, economical jig. Hardened steel block, V-grooved, provided with each "Yankee" Vise. Four sizes, with and without swivel base . . . 1 1/2", 2", 2 3/4" and 4" jaw widths. Your industrial distributor carries the full line. Write today for the "Yankee" Tool Book . . . handy tips about these and other "Yankee" time-saver tools.

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Fast and sure! In time and materials saved, the KVE Micrometer Stop pays for itself in a single run!

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Adaptable to all automatic and hand screw machines. Shank diameters: $\frac{3}{8}$, $\frac{3}{4}$, and 1 inch. Price \$7.50, postpaid. Start cutting costs — order by mail today!

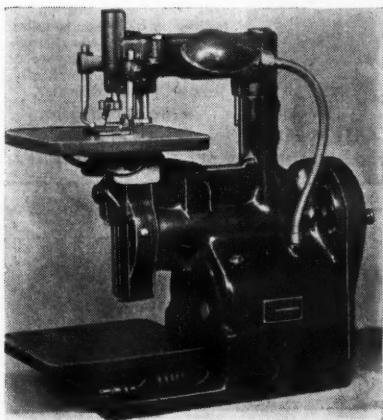
Keene Valley
ENGINEERING CO.

Homer, N. Y.

adjustable stroke of from 0 to $1\frac{1}{2}$ inches; compound tilting die table; hardened, ground, and lapped dovetail slide; retractable file holder; safety friction power; and chip blower and hose. Needle files are tensioned or stretched by a lengthy screw pulling upward upon the stem which mounts the upper file holder. By this same screw, the upper file holder can be raised or lowered $1\frac{1}{2}$ inches according to die thickness.

Saws are stretched in the same manner as files. Removable saw supports are provided above and below the die table with hardened interchangeable guide inserts for various widths of saws. The upper saw support can be raised or lowered 2 inches according to the thickness of the material.

Standard equipment of the Ideal Synchronized Duplex Die and Punch Making Machine



Ideal Synchronized Duplex Die and Punch Making Machine

Machine includes a $\frac{1}{4}$ h.p. 110-volt single-phase 60-cycle a.c. motor with cable and switch; 2-speed V-belt drive under hinged guard; flexible light stem with socket and shade; and a complete set of wrenches. Motors for other currents can be furnished on order.

Specifications of the unit are as follows: size of tables, 10 inches square; depth of throat for die filing, $9\frac{1}{2}$ inches; depth of throat for punch filing, $6\frac{1}{2}$ inches; length of die files, 4 to 8 inches; length of punch files, $3\frac{1}{4}$ inches with $\frac{1}{4}$ -inch round shanks; tilting range of die table, 15 deg. either side and rear and 45 deg. front; tilting range of punch table,

BAUMBACH

THE DIE SET
AUTHORITY

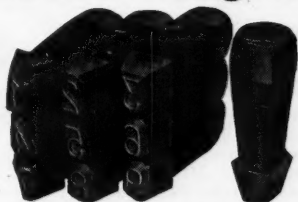
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TO ASSURE
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HIGH FINISH



All Baumbach Die-Sets have demountable Leader Pins and Bushings. This exclusive feature permits removing Leader pins for machine work on the die shoe and assures reassembly without loss of alignment. A big time and trouble saver. Write for Catalog.

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Of stand-up height, these sturdy all-steel desks with welded joints . . . are fire-resistant. Drawers can be locked, thus being tamper-proof. The smooth top has just the right slant . . . while conveniently located pigeon-holes enable easy filing of cards, records, etc. For information regarding other "Hallowell" Shop Equipment of Steel, write for the "Hallowell" Catalog.

"Hallowell" Products are sold entirely
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OVER 44 YEARS IN BUSINESS



Fig. 2197

STANDARD PRESSED STEEL CO.

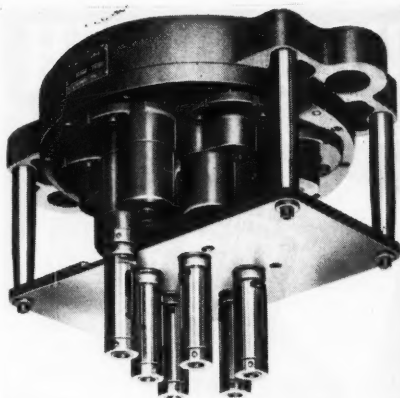
JENKINTOWN, PENNA. EDX 536 • BRANCHES: BOSTON • CHICAGO • DETROIT • INDIANAPOLIS • ST. LOUIS • SAN FRANCISCO

10 deg. toward front or rear; speeds, 350 and 525 strokes per minute; length of stroke, adjustable from 0 to $1\frac{1}{2}$ inches; bench space, 10 x 25 x 20 inches; and net weight, 170 pounds.

Kwick-Change Medium Heavy Duty Multiple Drill Head

To meet the demand for an adjustable, multiple drill head for use in large type drill presses and for heavy work, Strutz & Mead, Inc., Milwaukee 2, Wis., has added a medium heavy duty type to its Kwick-Change line of multiple adjustable drill heads. The head is available in standard models having from 2 to 6 spindles. Heads with more than 6 spindles can be obtained on special order.

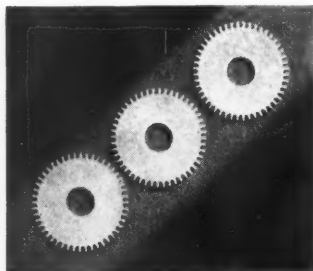
The Kwick-Change Medium Heavy Duty Multiple Drill Head is designed to drill holes up to $23/32$ inch in cast iron and is provided with No. 2 Morse taper spindles with vertical adjustment as standard equipment. The head has a gear ratio of 1 to 1 so that a lead screw may be used in tapping operations. The minimum center-to-center location is $1\frac{1}{8}$ inches. Diameters of bolt circles vary from $1\frac{29}{32}$



Kwick-Change Medium Heavy Duty Multiple Drill Head

inches minimum to $14\frac{43}{64}$ inches maximum. The overall height of the head without adapters is $13\frac{1}{4}$ inches.

The Kwick-Change Medium Heavy Duty Multiple Drill Head is entirely gear driven



3 OF A KIND

Completely Interchangeable

Complete interchangeability is highly important today in units which operate continuously or for long periods under a variety of conditions. If breakdown should occur, a new part may easily be installed and operation resumed in short order.

Original gears for such units, and also replacements must have positive guaranteed accuracy, tooth form and finish, or the mechanism may fail. Our completely modern shop, equipment and methods, can serve you with assurance on such requirements. Write us for quotation on your specifications.

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THREAD GRINDING

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**WORMS AND GEARS
SMALL OR MEDIUM**

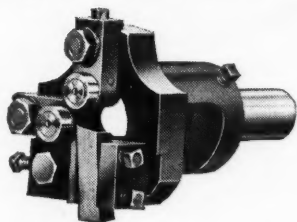
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**SPUR, HELICAL, BEVEL,
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A general purpose, tangent cut, roller rest box tool of wide range for turning diameters from bar stock, castings, forgings or other material. Applicable to all sorts of screw, turret and other machines, hand or automatic. It is simple to set and eliminates resetting when it is necessary to grind the bit. Write for descriptive folder giving complete information.

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MACHINE KEYS

ALL TYPES



Woodruff Keys • Machine Rack
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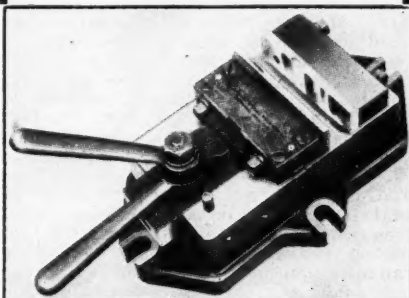
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The HARTFORD Milling Vise is very powerful and can be operated by a single hand. A cam handle for rapid closing and opening in combination with an eccentric handle for locking offers ease in operation. HARTFORD Milling Vises are famous for their power, speed, accuracy and strength.

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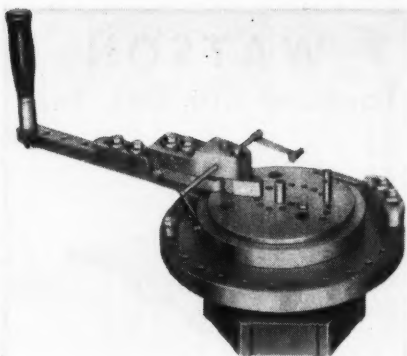
HARTFORD 5, CONNECTICUT

and embodies the same operating features as other heads in the line. Each drill revolves completely around two different centers, both having a 1.333-inch radius. Each drill can be located anywhere within a 5.332-inch circle, and all circles overlap, thus permitting an infinite variety of hole patterns. Positioning and locking templates are provided for each setup. The locking template is said to assure rigid, accurate setups which remain stable even on the longest runs.

Di-Acro Bender No. 1A

Capable of forming large radii in lightweight materials at a high rate, the Di-Acro Bender No. 1A illustrated has been designed by the O'Neil-Irwin Manufacturing Co., 306 8th Ave., Lake City, Minn. The unit is said to have all of the construction and operating features of other Di-Acro benders, including Torrington roller bearings which assure ease and speed of operation.

The Di-Acro No. 1A is designed to form and duplicate an unlimited variety of parts and pieces on a production basis, frequently eliminating the need for preparing special forming dies. The wide range of contour forming offered by the



Di-Acro Bender No. 1A

unit covers all types of ductile materials such as round, half-round, hexagon and square rod, tubing, angle, channel, molding, strip stock and bus bar. The universality of the bender permits the machine to cover its wide working range with the addition of simple conversions which can be quickly mounted on the machine for specialized forming operations.

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STRIPPER BOLTS!**

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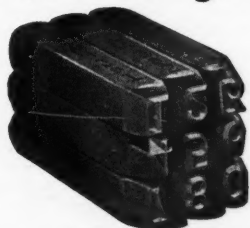
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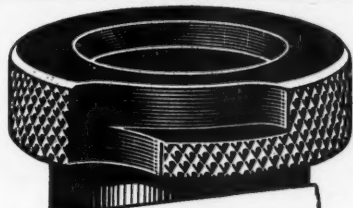
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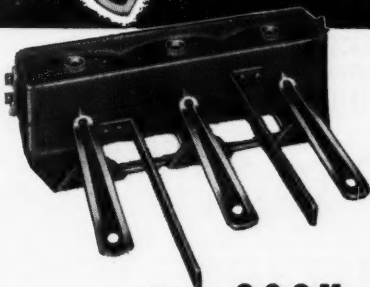
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HAMMERS!

YOU MAKE 'EM!

3

AT ONCE!



WITH THE *New* **COOK**
PRODUCTION HAMMER MOLD!

EASY to use! Close lid of mold . . . pour lead from lead pot or ladle into 3-in-1 mold . . . that's all!

SHUR-GRIP HANDLES — The Cook 3-in-1 Hammer Mold is made expressly for extra safe COOK SHUR-GRIP handles!

A Complete Lead Hammer Service

Handles (Shur-Grip) Mold and Ladles (single and 3-in-1 molds) Ready-Made Lead Hammers (in stock from 1 to 11 lbs.)

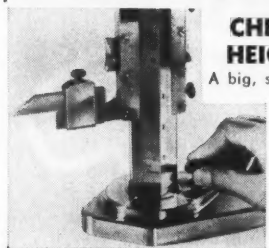
Ask for complete price list H.
Address Dept. 4

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PLASTIC MOLDS AND TOOLS

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SCHERR aids to precision — production



CHESTERMAN HEIGHT GAGE

A big, sturdy stabilized instrument which can double the output of your skilled toolmakers. Fine adjustment by screw operated from knurled nut on base eliminates all rocking or shifting instru-

ment while measuring. Finger pressure on two lugs frees split nut for rapid up or down adjustment. $2\frac{1}{2}$ " long vernier in place of the normal $\frac{3}{4}$ " vernier gives greater visibility without the need of magnifier or removing gage from work. Both English and metric readings on column. Made in sizes from 12" to 48"—capacities sufficient for the most unusual measurements.

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Here is the basis for vertical measuring accuracy—an optically ground glass surface, flat within 50 millionths over the total area. A solid, non-warping, thick disc of Pyrex brand glass, set in a heavy wood base with dust-proof cover. Immune to the internal strains which may affect the accuracy of metal surface plates, with the added advantage that accidental scratches cannot cause raised burrs, nor usage wear the hard surface. For real accuracy in layout work and critical inspection, start from the perfect surface of a Scherr Opti-Flat. Two sizes—12" diam., 2" thick, and 16" diam., 3" thick. Also a complete stock of hand-scraped metal surface plates, angle irons, measuring irons, etc.

ULTRA-CHEX GAGE BLOCKS

The last word in modern basic accuracy brought within the grasp of all shops large and small. Sets in size for all budgets. All blocks accurate to five millionths. Illustrated is the 34-block set, giving 80,000 combinations in steps of $1/10,000$ ", with optical flat for checking wear. Low prices allow for constant practical shop use in setting tools, checking gages, locating holes in jigs and fixtures, etc. Many shops use a number of sets, with one master set for reference.

Write for full details on these tools, and for the Scherr Small Tool Catalog.

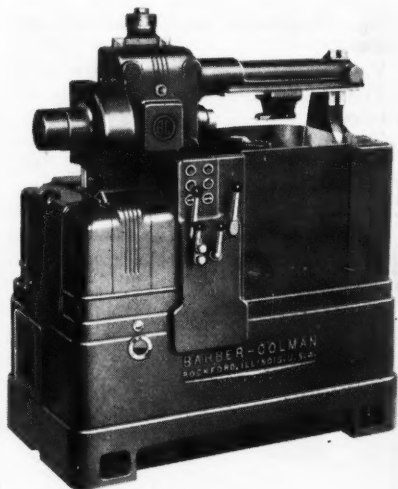
GEO. SCHERR CO., Inc.

198-A Lafayette St. New York 12, N. Y.

Barber-Colman No. 8-12 Production Hobbing Machine

Featuring semi-automatic cycling, speed for carbide hobbing, conventional and climb hobbing in either direction, rapid traverse in either direction, and an overall design that facilitates operation, servicing, and maintenance, the Barber-Colman No. 8-12 Production Hobbing Machine illustrated herewith has been brought out by the Barber-Colman Co., Rockford, Ill. The machine is constructed in unit assemblies with hardened and ground vee and flat ways on the horizontal bed and a one-piece overarm, index worm gear case, and work slide.

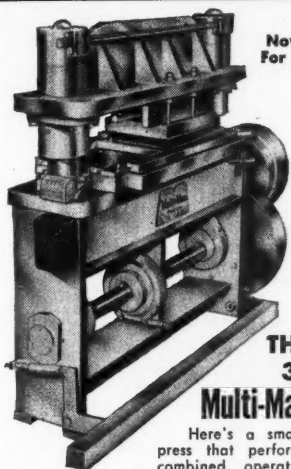
For the ordinary run of jobs, the machine can be operated semi-automatically.



Barber-Colman No. 8-12 Production Hobbing Machine

ly. Once the initial setup is made, the operator merely loads and unloads the work and pushes the cycle lever. For high production runs on appropriate parts, the machine is designed to accommodate magazine loading so that the operation is completely automatic.

The Barber-Colman No. 8-12 Production Hobbing Machine is constructed to handle work up to 8 inches in diameter on some pitches and has a hob slide travel of 12 inches. The maximum tooth form which can be hobbled under opti-



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For Delivery

THE NEW 30-TON Multi-Max Press

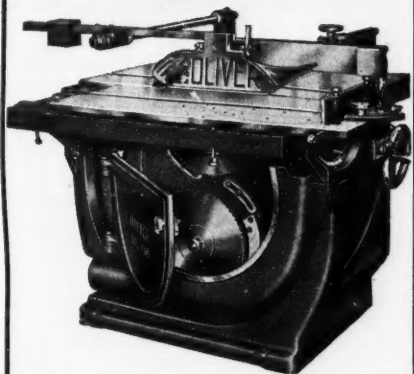
Here's a small versatile press that performs all the combined operations of a shear, press, brake and forming machine. It may be picked up and moved in and out of the production line as needed. Finished parts are fabricated right at the point of assembly. Saves handling, stacking and storage costs. Write for specifications and prices.

PARKER MANUFACTURING CO.
2200 Colorado Ave., Santa Monica 5, Calif.

"OLIVER" Saw Bench

DOUBLE ARBOR
TILTING

for pattern shops



Rip or cross-cut saws available instantly. Table stays level; saw tilts up to 45°. Automatic brake. Push button control—only saw projecting thru table runs. Ask for Bulletin 260.

OLIVER MACHINERY CO.,
Grand Rapids 2, Mich.

WHEN HE FORGETS... THE GUARD REMEMBERS!



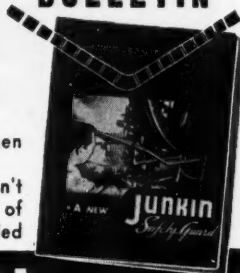
Here's protection against those forgetful moments when tragedy lashes out to claim its toll.

The Junkin Safety Guard is effective . . . dependable. It can't "forget" because it's built in . . . actually becomes a part of the press itself. That's how Junkin is helping thousands of satisfied users set up better safety records . . . higher production records.

If you would like the facts about Junkin Safety Guards, write. There's no obligation.

JUNKIN SAFETY APPLIANCE CO., INC.
930 WEST HILL STREET, LOUISVILLE, KENTUCKY

WRITE FOR
THIS NEW
BULLETIN



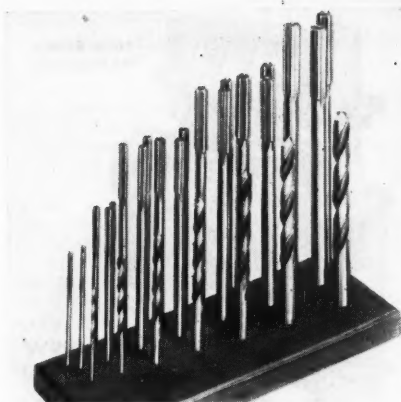
JUNKIN SAFETY GUARD

mum conditions is 10 diametral pitch, and the maximum hob diameter which can be used is $2\frac{1}{4}$ inches. The machine is standardly provided with spindle speeds of from 150 to 1,350 r.p.m. and feeds per revolution of work ranging from 0.005 to 0.400 inch. All moving members of the machine are rigidly and durably constructed to provide for maximum accuracy and to permit the use of fast machining speeds and the taking of heavy cuts.

"Supeream" Decimal Size Reamer

The Twentieth Century Manufacturing Co., 3724 Montrose Ave., Chicago 18, Ill., is now producing a decimal size reamer under and over the regular standard sizes from 0.0461 to 0.0501 inch. Known as the "Supeream," the tool is available in over 509 different standard sizes and in special sizes from 0.0501 to 1.510 inches.

According to the manufacturer, all flutes of the Supeream Reamer are ground on the face and back after heat treatment to provide for smooth reaming and to prevent clogging or freezing of



"Supeream" Drill and Reamer Set

chips. All diameters are said to be held to plus 0.0002 inch and minus 0.000 inch for close sizing. Size markings are stamped halfway up on shanks so that they cannot be obliterated by drill press chucks.



GET THE WHOLE STORY OF SERVICE WITH A

Punch!

Allied's 48-page R-B catalog contains complete data and prices on R-B Interchangeable Punches and Dies—recognized and used for accurate, trouble-free punching throughout the metal-working and plastics industries. But that is only part of the R-B story. Also included in this catalog is

full information on Allied's "one stop service" which includes retainers, composite die sections, rubber strippers, guide pins and bushings, and miscellaneous die makers' supplies. A copy is available to you without charge or obligation. Write for it today.



ALLIED PRODUCTS CORPORATION

Department 23 • 4624 Lawton Ave. • Detroit 8, Michigan

Heavy Duty • Bench Type

ENGRAVING MACHINE

Interchangeable heads for engraving, electrical marking, and acid etching . . . available for all models. Also Panto engraving cutters, cutter grinders, master copy type, endless belts and accessories.



The PANTO
MODEL UE-3

LIGHTER MODELS UE and UE-2

Catalog
On
Request

H. P. PREIS ENGRAVING MACHINE CO.

149A Summit St. • Newark 4, New Jersey

STANDARD STEEL SPECIALTIES

MACHINE KEYS

We can supply a complete line of finished machine keys including gib head, and taper keys, rod keys, round end keys, etc.

WOODRUFF KEYS

Complete stock of standard keys on hand for prompt shipment. Made from open hearth or alloy steel.

TAPER PINS

Available in sizes 7/0 through 10 and lengths from 1/4 inch to 6 inches. Others made to specification.

MACHINE RACK

Can furnish rack from almost any size blank and pitch as well as length to form continuous sections.

Write for catalog

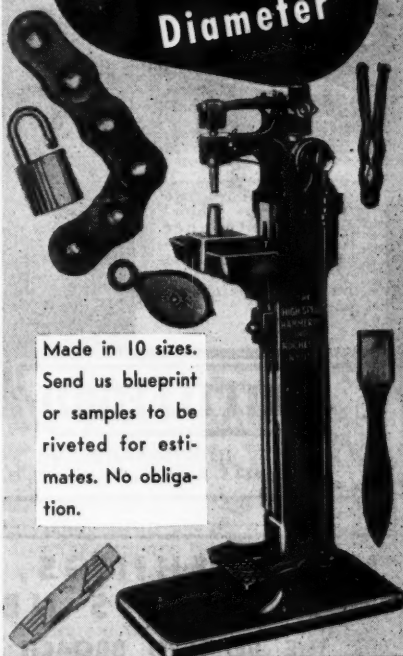
STANDARD STEEL SPECIALTY COMPANY

BEAVER FALLS

PENNSYLVANIA

PLANTS: BEAVER FALLS, PA. • HAMMOND, IND.

High Speed COLD Riveting From 1/64" To 2" Diameter



Made in 10 sizes.

Send us blueprint
or samples to be
riveted for esti-
mates. No obliga-
tion.

THE HIGH SPEED HAMMER CO.

RIVETING HEADQUARTERS

307 NORTON ST., ROCHESTER 5, N.Y.

An outstanding feature of Supercam Drill and Reamer Sets, such an illustrated herewith, is the individual serial numbering of each set for inventory control, as well as identification for each user. The set illustrated is available with a stand and also without drills.

KVE Micrometer Stop

A micrometer stop for speeding up the correction of stock lengths in screw machining is now being manufactured by

HIGH QUALITY LOW COST in Machine Bases

After 65 years, we really know how! Lighter, stronger bases; entirely accurate; any size; no cost of molds or castings. Let us fabricate your bases.

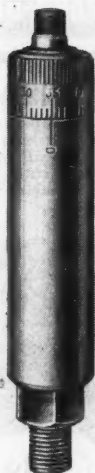


LITTLEFORD

LITTLEFORD BROS., INC.
433 E. Pearl St., Cincinnati 2, O.

the Keene Valley Engineering Co., Homer, N. Y. Designated as the KVE, the stop, according to the manufacturer, eliminates trial and error methods in making screw machine set-up adjustments and not only provides for exact corrections but also saves considerable operator time in making setups.

A micrometer dial caps one end of the KVE Micrometer Stop. The bolt on the other end of the stop is turned by the operator to conform to any adjustment made by turning the dial. An exact correction of a stock length can be made to a thousandth of an inch by simply adjusting the micrometer dial after running only one piece, it is claimed. The stop is available in three shank diameters of $\frac{3}{4}$, $\frac{5}{8}$, and 1 inch.



KVE Micrometer Stop

"Bench-King" Vise

A solid bronze vise with tool steel fingers, to be known as the "Bench-King," is now being marketed by Benjamin Uydess & Sons, Inc., 960 E. 167th St., Bronx 59, N. Y. A particular advantage which is claimed to be provided by the vise is the elimination of the danger of a jewelers' saw blade breaking and injuring the

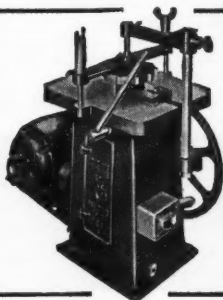
NO BUSHINGS, GUIDES or PILOTS NEEDED!

THE READING BROADCH KEYSEATER

The Reading Bench Machine requires no bushings, guides or pilots. No other machine like it. Very fast—capacity from $\frac{1}{8}$ to $\frac{3}{4}$ cutter.

Low first cost—prompt delivery.

READING MACHINE COMPANY, Reading (Cincinnati), Ohio



PUT A NICHOLSON AIR TRAP ON A TEST LINE

Here's What You'll Find

POSITIVE FLUID SEAL assures clean air without loss of medium.

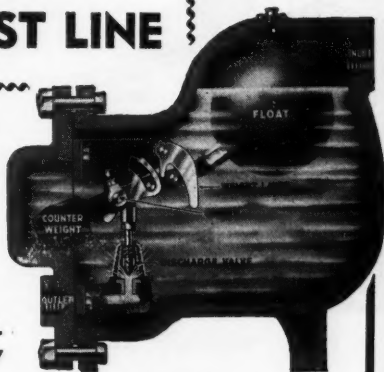
FAST ACTION, due to intermittency.

RUGGED, to take unavoidable abuse.

STAINLESS STEEL where it counts.

NON-WIRE DRAWING.

MINIMUM MAINTENANCE—Not easily affected by dirt, pulsation, etc.; easily connected.



MODEL JR

W. H. NICHOLSON & CO.

136 OREGON ST., WILKES-BARRE, PA.

Valves • Floats • Steam Specialties • Mandrels

Air traps for all applications,
and for pressures to 1500
lbs. . . CATALOG 444.



Stampings

**ANY SIZE—
ANY SHAPE—MADE
QUICKLY AND ECONOMICALLY**

H P L Manufacturing Company, through an exclusive process, is taking orders in quantities of twenty-five pieces and up for blanking, piercing, forming, tapping, counter-sinking, extruding, stenciling and similar operations on cold, punchable material.

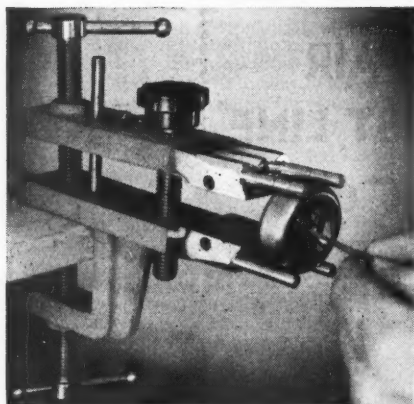
The HPL process assures fast, accurate dependable work at low tool cost. It is flexible to change in design yet maintains the closest tolerances and exact duplication.



HPL Manufacturing Co.

2013 E. 65th ST., CLEVELAND 3, OHIO

**STAMPINGS
IN SMALL
LOTS**



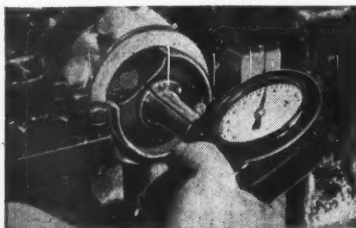
"Bench-King" Vise

hand while cutting out intricate templates, cutter plates, and die sections since only one hand is required in performing the operation, this hand being the one that holds the saw. The work is held firmly and in an unusually conven-

ient cutting position.

The grounded jaws of the Bench-King Vise are designed to hold safely, and without marring, workpieces from 0.001 to 2½ inches in thickness at any point within the jaws. With the tool steel fingers, which are held in receptacles within the lower and upper jaws, work of odd shapes can be conveniently and firmly held. Six receptacles are provided in the front of the jaws so that by shifting the tool steel fingers within the various receptacles, the vise can be made to accommodate various odd shapes and sizes of parts, including discs, gears, balls, half balls, medallion hobs, and so on. Two holes are also provided on each side of the vise for various combinations of the fingers, which are included with the vise as standard equipment.

According to the manufacturer, the Bench-King Vise is extremely useful for holding light delicate tubes, rings, and so on, in performing such operations as sawing and filing without marring or distorting the piece cut or its remainder. When used in reverse, the vise can be employed as a small screw press for forcing and driving small work, such as small forming dies or curling tools. The vise, which weighs 4½ lb. complete with accessories,



Comtorplug in use on turret lathe.

Modern machine tools have NOT outrun ALL shop gages! Although solid plugs are inadequate, the patented expanding, internal gage known as "Comtorplug" puts positive, precise gaging in the hands of your machine operators and bench inspectors. Made in sizes to gage holes from ¼" to 8" dia. Shows exact size (not a passing reading), detects out-of-round, front or back taper, bell mouth, etc., to fractions of .0001". Automatic accuracy, free of human variations. Gages without removing work from chuck. In use at machines in hundreds of plants—"shop ruggedness with laboratory accuracy." Your new machines can produce the top accuracy of which they are capable, only if your operators have gaging precision comparable to the machine's precision. "Comtorplug" is the answer—see it and you'll see why.

Request 8-page Bulletin No. 33

COMTOR CO.

64 RUMFORD AVENUE

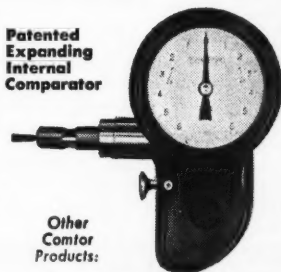
WALTHAM, MASS.

Here's HOLE GAGING that matches the new machines in speed, accuracy

COMTORPLUG

used for bench inspection and AT or IN the machine.

Gages holes ¼" to 8" dia. to fractions of .0001".



Patented
Expanding
Internal
Comparator

Other
Comtor
Products:

"COMTORGAGE," Precision External
Comparator: Bulletin 30
COMTOR SURFACE SMOOTHNESS
COMPARATOR: Bulletin 32A

**Accurate Hole Transfer Made Easy With
NIELSEN TRANSFER SCREWS**



Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 7 sizes U.S.S. Inexpensive — Last for years. Write for Circular.

NIELSEN TOOL & DIE COMPANY
1960 W. Eleven Mile Rd.
Berkley, Mich.



**Sauereisen
Acid Proof Cement No. 31**

A quick setting, self-hardening white cement which is applied cold. Will resist water, oil, electricity, most solvents, acids and temperatures to 2000° F. Used with acid proof brick in the construction of pickling tanks, pits, sewers, floors and chimneys.

Order a 10 Lb. Lot at \$3.00 for Testing

Write for Our Indexed Price Chart

Sauereisen Cements Company

47 Sharpsburg St.,

Pittsburgh 15, Pa.

**You need only one
DORMAN TAPPER**

... instead of three ordinary tappers ... to tap No. 2-56 to 3/8" in steel or any other metal.

Here are three more advantages

1. No collets to get lost or need replacement.
2. Adjustable friction drive.
3. Can produce No. 3 or No. 4 fit.

The No. 2A tapper drives from 3/8" to 7/8" and No. 3-A drives from 1/2" to 1 1/4" in any tapable material.

Price No. 1 Size \$40.00 with M.T. Shank or \$45.00 with Adapter for Male Spindle Drill Press. Round Split, Button or Acorn Die Holder Assemblies in stock for all size Dorman Tappers permitting their use for external threading.

Write for Die Holder Bulletin



DORMAN MACHINE TOOL WORKS

36 S. MAC QUESTEN PKWY.
MOUNT VERNON • NEW YORK

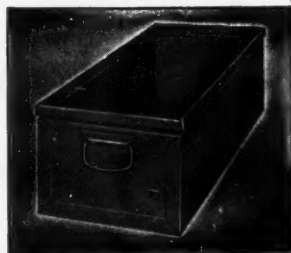
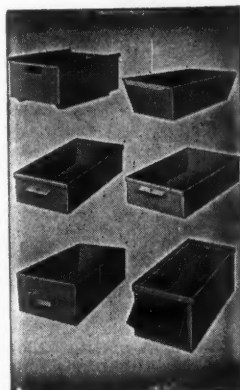
Top Rim STEEL STACKING BOXES

18" x 12" x 6". 16 Ga.
with Drop Handles

STANDARD SIZES

- 16 x 10 x 6.....18 Ga.
- 16 x 10 x 6.....16 Ga.
- 18 x 12 x 6.....16 Ga.
- 18 x 12 x 8.....16 Ga.

MADE IN OTHER SIZES



WE MANUFACTURE ALL TYPES OF STEEL BOXES

We make a specialty of boxes made to fit your particular handling requirements. Special boxes designed so they can be run thru with standards enable us to quote prices comparable with that of a standard box.

STERLING
FACTORY EQUIPMENT CO

183 CHARLES ST.
PROVIDENCE, R.I.

Put the
**"POCKET-SIZE
 MACHINE SHOP"**
to Work!

**MOTO-TOOL
 No. 2 WITH
 EMERY POINT**

\$16.50



Approx.
 27,000
 R.P.M.

DREMEL'S Improved Moto-Tool . . . the little electric grinder that does big jobs . . . can save you hours, by speeding up work now being done by hand. Invaluable for sharpening taps, drills, gauges, chisels, tools and cutters (without tearing down "set-ups"). Dremel Moto-Tool is a "war veteran" . . . used by all branches of the Armed Forces in far-flung repair bases . . . helped to set production records at General Electric, Westinghouse, Remington Arms, Ford, Nash-Kelvinator, Northrup, Douglas and other plants.

LOOK FOR THESE MOTO-TOOL FEATURES

- Housing has "pencil-type" finger tip • Instant-action, wrenchless chuck • Oil-less, sealed trouble-proof bearings • Patented automatic chuck lock pin • Oversize armature shaft, hardened, ground and polished • 110 volt, universal type (AC-DC) motor • Easily replaced commutator brushes • About 27,000 R.P.M.; cuts cleaner . . . saves cutters • Sliding snap-type switch • Handy hanger hook • Cord protector • Sturdy, shockproof bakelite housing • Dust-filtered air-cooling system • Weighs only 13 oz. . . . shaped to fit the hand • Dynamically balanced for vibrationless operation.

MOTO-TOOL KIT No. 2



With 23
 Accessories
\$23.50

PRE-WAR
 PRICES
 STILL
 PREVAIL

Moto-Tool Kit No. 2, with 23 accessories (high speed steel cutters, grinding wheels, polishing accessories) and heavy-duty professional Model 2 Moto-Tool in natural finish, hardwood case—**\$23.50**. (Items purchased separately would cost about \$30.00; you save \$6.50). Moto-Tool No. 2, with one emery point, **\$16.50**.

**SEE YOUR MILL SUPPLY DEALER. IF HE DOES NOT
 HANDLE MOTO-TOOL, WRITE THE FACTORY.**

DREMEL MANUFACTURING CO.

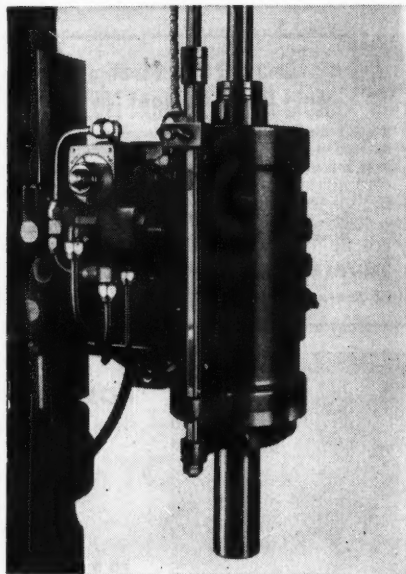
DEPT. T-237-L

RACINE, WIS.

features a high polished bronze and baked gray crackle finish and incorporates operating screws of 1/2-inch diameter steel.

**Hydraulic Power Feed for Canedy-
 Otto Sliding Head Floor Drill**

The Canedy-Otto Manufacturing Co., Chicago Heights, Ill., announces the development of a hydraulic power feed for



Close-up view of Canedy-Otto Hydraulic
 Power Feed installation

its sliding head model drill presses. The hydraulic power feed is said to combine high efficiency with extreme simplicity of design.

According to the manufacturer, the hydraulic power feed will not only be incorporated into new Canedy-Otto drill presses but will be available for easy attachment to existing models. The attachment is said to make the Canedy-Otto machine fully automatic instead of semi-automatic as at present, and can be operated automatically, semi-automatically, or manually. It is provided with a convenient adjustment for obtaining

FLYNN

OFFSET BORING HEADS



Micrometer offset screw ground from solid.

Large, easy to read dial graduated in .001"

Tool block hardened, ground and fitted to body.

"V" tool block holds any size bar rigid.

Interchangeable shanks and arbors.

USED FOR 30 YEARS IN TOOL ROOMS AND PRODUCTION SHOPS FOR PRECISION BORING

Head No.	Body Dia.	Maximum Bar Capacity	Micro Offset	Price
6	1 1/2"	3/4"	1/4"	\$ 22.
8	3 1/4"	3/4"	1/2"	30.
10	4"	3/4"	1/2"	70.
12	4"	3/4"	1"	45.
20	7 1/2"	1 1/2"	1"	125.
30	4"	3/4"	1 1/4"	70.
32	5 1/4"	1"	2"	115.
35	4 1/4"	3/4"	1 1/4"	85.
36	6 1/4"	1 1/4"	2"	150.

FLYNN MANUFACTURING CO.
317 BATES STREET • DETROIT 26, MICHIGAN

ANNOUNCING

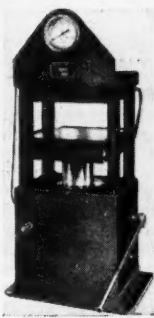
A New Member in the M&N Line of Hydraulic Presses
THE 30-TON ELECTRIC HOT PLATE MOLDING PRESS

This new press is especially designed for the rubber and plastics industries, where speed and ease of operation is essential to low cost production, and laboratory uses. This press can be had with any desired number of openings, either electric heated or steam platens, at a slight additional cost; or larger platens. Motor driven hydraulic power units are also available.

Outstanding features of this new press include: Visual temperature indicator. Electrically heated thermostatically controlled platens. Dual pressure hand pump. Compactness. Large platen area. All steel construction.

SPECIFICATIONS: Size of Base, 16"x12"; Overall height, 42"; Platen size, 12"x12"; Capacity, 30 tons; Daylight opening, 10"; Stroke, 6"; Ram dia., 5"; Approx. Weight, 400 lbs.

M&N MACHINE TOOL WORKS INC.
144 Orono St. Clifton, N. J.



\$525.00

A New TOOL THAT SOLVES AN Old PROBLEM!

'NTS' CARBIDE DRILLS FOR RAPID DRILLING OF CLOSE TOLERANCE HOLES IN STEEL AS HARD AS 66-C

The tool that's been needed for years in production as well as tool and die shops. Drills holes faster. Drills more holes per grind. Will not anneal or discolor work. Each hole perfect as though drilled before hardening.

WRITE FOR OUR CATALOG.



ARE YOU DISCARDING WORN TOOLS THAT CAN BE SALVAGED FOR OTHER OPERATIONS? NATIONAL RECLAIMS DAMAGED AND WORN TOOLS FOR A FRACTION OF REPLACEMENT COSTS.

NATIONAL TOOL SALVAGE COMPANY

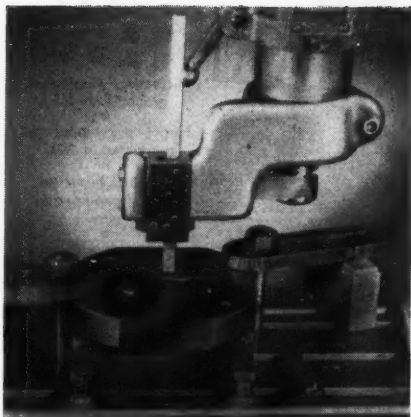
6511 EPWORTH BOULEVARD • DETROIT 10, MICHIGAN

ing various rates of feeds. Units equipped with the attachment may be used for honing, lapping, tapping, and drilling operations. In the automatic position, the attachment provides a reciprocating action to the spindle.

"Will-Wood" Filing Attachment

Known as the "Will-Wood," a filing attachment that is designed to provide for the fast and economical production of templates, punches, and dies by permitting the use of ordinary mill files for precision filing with index machines and Bridgeport milling machines is now being manufactured by W & W Tool and Die, Inc., Midland, Mich. The device can be quickly and easily installed on the machine spindle from which the cutter has been removed. In addition to being easily installed on the machines mentioned above, the attachment is said to be adaptable to all other type high speed heads.

In operation, the filing speed is controlled by the spindle speed. The attachment is designed to travel the file only $\frac{1}{4}$ inch, thus eliminating unnecessary wear on the tool. When one portion of the file be-

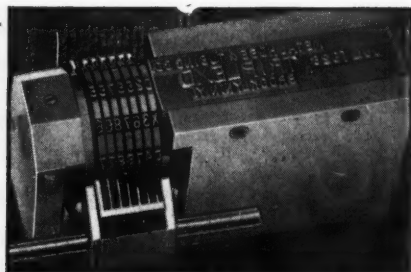


"Will-Wood" Filing Attachment in Use

comes dull and unserviceable, the worn end can be simply broken off and the file advanced to a new cutting position in the holder.

According to the manufacturer, the ri-

High Speed
COUNTERBORES
BACK
SPOT
FACERS
 •
 Interchangeable
 •
Catalog
on
Request
BICKNELL-THOMAS COMPANY
 Greenfield Massachusetts



COMBINATION AUTOMATIC NUMBERING HEADS AND MARKING DIES

For automatic serial numbering and marking, it cuts costs by eliminating dual operation.

Write for full information.

MARK IT BEST WITH
NOBLEWEST

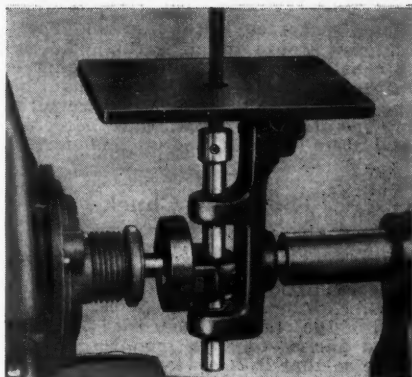


Noble & Westbrook Mfg. Co.
 25 Westbrook St.
 East Hartford 8, Conn.

gidity with which the file is held in the Will-Wood Filing Attachment and the smooth filing stroke provided ensure clean, sharp filing of corners, straight lands on dies and punches, contours, and radii. Accuracy is said to be limited only by the accuracy of the feed dials on the machine. Hones may be inserted in the attachment when extremely close work is required. All moving parts of the attachment are hardened and ground for maximum durability, and the file holder is constructed with the dovetail and gib carefully fitted.

Carey-Anslinger Filing Attachment

Said to readily convert a lathe into a versatile, accurate filing machine for wood and metal-working operations, the Carey-Anslinger Filing Attachment illustrated herewith is now being marketed by the Carey-Anslinger Manufacturing Co., 2219 E. Superior St., Duluth, Minn. Compactly constructed, the attachment can be quickly installed by simply slipping the tapered arbor into the tailstock of the lathe and clamping the shaft into a three-jaw chuck or collet.



Carey-Anslinger Filing Attachment

Designed to accommodate standard $\frac{1}{4}$ -inch shank files or hack saw blades, the Carey-Anslinger Filing Attachment, according to the manufacturer, is adjustable for all angles and can be used in any position and operated at any speed. Said to fit any lathe, the attachment features self-lubricating bronze bushings, 15 per

NEW DRILLS FROM OLD WITH NU-TANGS



Send us your old drills—we'll make them new again at a fraction of the cost of a new drill! Exclusive NU-TANG* process replaces twisted or broken tangs with brand new tangs of correct size—and with GUARANTEED ORIGINAL STRENGTH. No welding—No distortion—No shortening of drills—No sleeves.

Any drill, reamer, or other tool with a Morse taper in sizes 2 to 6 can be repaired perfectly this quick new way. Delivery—One week. Used by many leading industrial plants. Amazingly low cost—satisfaction guaranteed! Send for complete information.

*Patent Pending.

NU-TANGS INC. 1337 Bates Street
Cincinnati 25, Ohio

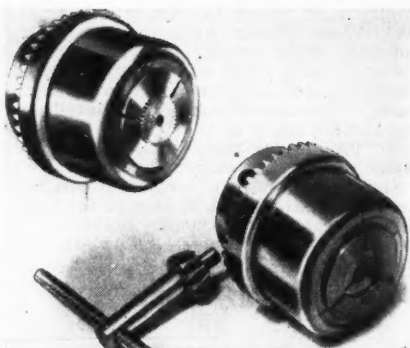
write today

cent steel castings, ground No. 2 Morse taper, socket set screws, ground shaft, and cast bronze driver bearing. The unit is constructed to permit the gaging or inspection of work without dismantling the machine, and can be used in performing operations on metal, wood, hard rubber, fibers, plastics, and other materials.

"Bordjaw" Chuck

Designated as the "Bordjaw," a small lathe precision chuck with lateral movement only is now being marketed by the Edward Blake Co., 634 Commonwealth Ave., Newton Centre 59, Mass. The design of the chuck is such that it can be faced and bored after mounting on the lathe so that it is always true with the lathe. The jaws can be bored on the lathe to ensure absolute concentricity and can also be rebored at any time for any other larger size. Different sets of jaws can be kept for jobs which are to be repeated later.

An outstanding advantage of the Bordjaw Chuck is the possibility of boring the jaws to accommodate thin pieces, thereby ensuring not only concentricity but accurate facing so that pieces held in the



(Above) "Bordjaw" Chuck being used to grip a small gear. (Below) View showing how the jaws are bored for gripping the gear evenly. Key for opening and closing the jaws is also shown.

jaws can be machined with parallel faces. The body of the chuck is marked so that the numbered jaws can be removed from the chuck and replaced without loss of accuracy. The jaws are made of cast iron.

Designed for removing from the lathe

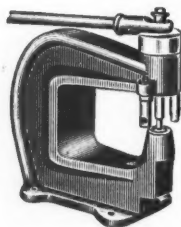
WHITNEY-JENSEN PRODUCTS

30 YEARS EXPERIENCE

Nos. 7, 7 1/2, 8 METAL PUNCHES

Capacity—1/4 thru 1/8", 3/16", 1/4"

Punches and dies available 3/32" thru 1/2" by 1/64" variation.



Nos. 24 and 25

BALL BEARING PUNCHES

Capacities—1/2" thru 3/8", 3/8" thru 3/4"

Throat Depths—3 1/2" and 8"

Punches and dies 1/8" thru 13/16" by 1/64"

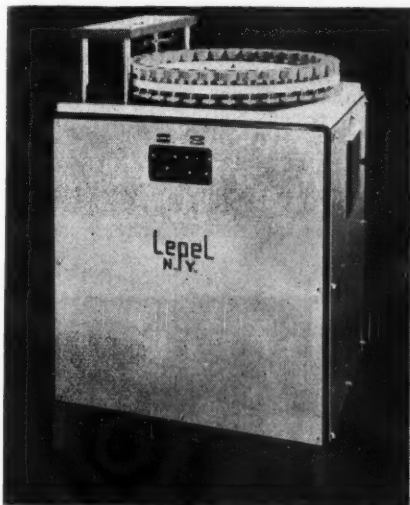
WRITE FOR NEW CATALOG

WHITNEY METAL TOOL COMPANY
116 FORBES ST. ROCKFORD, ILL.

and replacing without loss of accuracy, the Bordjaw Chuck is made for lathes having threaded nose spindles (1½-inch 8-thread). The closing ring of the chuck is operated by a key so that an unusually firm grip can be obtained on the work when desired.

Lepel Improved Automatic Turntable

Lepel High Frequency Laboratories, Inc., 39 W. 60th St., New York 23, N. Y., has announced the availability of an im-



Lepel Improved Automatic Turntable

proved automatic turntable for use in the continuous soldering, brazing, and annealing of small ferrous and non-ferrous parts. The table incorporates small cup-like receptacles in which the parts to be treated are placed. The receptacles simplify the positioning of the parts and therefore assure uniform heating, it is claimed.

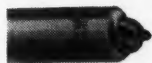
According to the manufacturer, the Lepel Improved Automatic Turntable can be operated from any 115-volt, 60-cycle supply source and is powered by a 1¼ h.p. motor. The speed of the table can be varied from ¼ to 3 r.p.m., thereby permitting a wide range of heating cycles. The receptacles mounted on the table

ACCURACY ✓

SPEED ✓

LONG TOOL LIFE ✓

in Truing and Dressing Operations with J. K. SMIT DIAMOND TOOLS



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To assure uniformly successful results, the finest in diamonds, materials and workmanship are blended into every J. K. Smit Standard Tool. And you can count on *exact* dimensions for every make of grinder. In ordering, state the grinder manufacturer's name and type of machine.



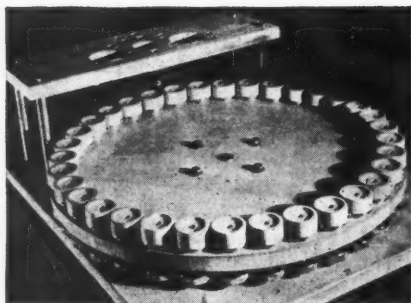
J. K. SMIT FORM DRESSING TOOLS

Designed to dress abrasive wheels with speed in any variety of shapes required, J. K. Smit Form Dressing Tools are made with selected diamonds that permit close tolerances, high finish and long tool life. Blade and chisel tools, cone shaped, pyramid type and other dressers with formed radii and specific included angles are available. Write for catalog.

J. K. SMIT & SONS, Inc.

117 Chambers St., New York 7, N. Y.

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Close-up view of Lepel Improved Automatic Turntable showing details of work-holding receptacles

are used in carrying the parts through the load or heating coil and automatically revolve as the parts are being heated, thus assuring uniform heat distribution. Any heating temperatures can be easily attained on a production-line basis and as many as 68 parts per minute can be processed, the manufacturer states.

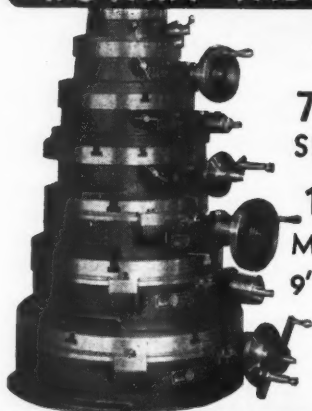
An outstanding advantage claimed for the turntable is the fact that skilled op-

erators are not required to assure uniformity and exact control of heating. Cool, clean working conditions are additional features provided by the unit, which is normally used with a standard Lepel high frequency converter of any rating but is also suitable for use with other high frequency generators.

"Airgrip" Drill Press Chuck and Cylinder

A combination drill press chuck and cylinder which is said to greatly increase production where extensive drilling, tapping, or counterboring operations are performed is now being introduced under the name of "Airgrip" by the Anker-Holth Manufacturing Co., 2731 Conner St., Dept. 66, Port Huron, Mich. The unit consists of a standard Airgrip chuck mounted directly to a non-rotating cylinder having a mounting base suitable for drill press or similar tables. Chuck and cylinder combinations can be furnished with either solid or hollow centers, the latter permitting the workpiece when released to drop through the unit, thereby saving handling time.

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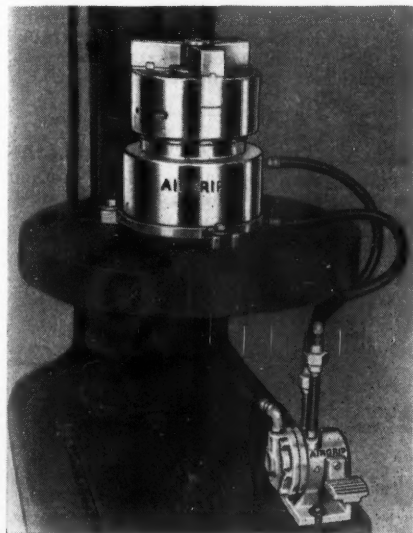
For Tool, Die, Pattern or Template layout on metal . . . Quick identification of stock and parts . . . Shows up in sharp relief—dries instantly—easily removed . . . Write for circular.

*Purple shipped unless otherwise specified.

**MICHIGAN CHROME &
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The Airgrip Drill Press Chuck features a double-gripping action—powerful airgrip locking and holding, either externally or internally. The drill press chuck units are said to have a wide variety of uses in addition to those mentioned where neither the chuck nor the cylinder must revolve, such as on assembly benches, milling machines, and special tapping machines. The use of an Anker-Holth foot control valve is especially recommended with the chuck and cylinder combination. The valve is designed to



"Airgrip" Drill Press Chuck and Cylinder Mounted on a Drill Press Together with "Airgrip" Foot Control Valve

automatically lock in position when the operator applies the initial pressure and to maintain its locked position until pressure is again applied by the operator.

Hammond No. 52 Bench Backstand

Identified as the No. 52, a bench backstand which is designed to convert existing wheel bench grinders into high production abrasive belt units for fast, efficient grinding, deburring, and finishing operations is announced by Hammond Machinery Builders, Inc., Dept. GP-21,

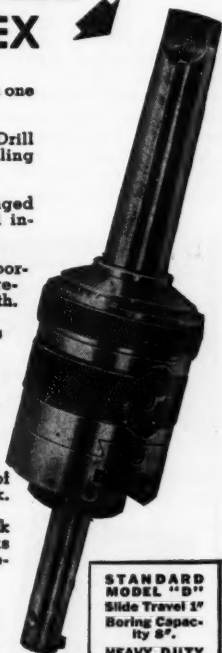
Power Facing and Boring with ONE Tool Head

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- 3 Power feed engaged and disengaged instantly.
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- 5 Cutting bar takes any position in Tee Slot of Slide.
- 6 Power feed for facing assures smooth, uniform movement of tool across work.
- 7 Any style shank available. Shanks are interchangeable.

Precision Constructed: feed screw and worm gear ground from solid; bronze feed nut and bushings.

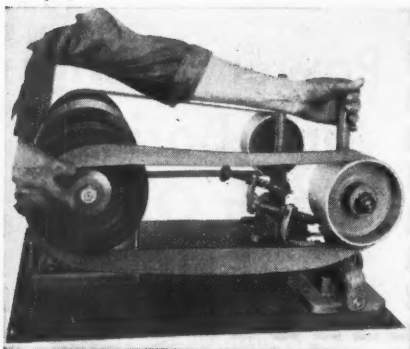
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Boring Capacity 8"
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3 sizes of slide
travel 2-1/2",
3-1/2", 4-1/2"
Boring Capacity 26"

CHANDLER TOOL CO.

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Hammond No. 52 Bench Backstand being used with standard bench grinder

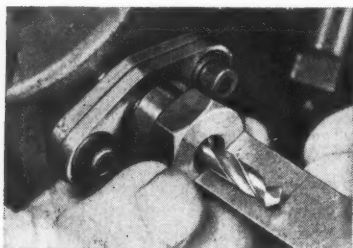
1615 Douglas Ave., Kalamazoo 54, Mich. Since grinding wear is on the abrasive belt and not on the supporting contact wheel, the contact wheel is said to remain true with square corners and to maintain its diameter and balance. The abrasive belt is claimed to cut coolly since a minimum of pressure is applied while grinding and the grinding is per-

formed over an unusually large abrasive area. The resiliency of the contact wheel eliminates work chatter and operator fatigue, it is stated.

The design of the Hammond No. 52 Bench Backstand includes a heavy cast iron base drilled for wood or metal bench installation, and a dynamically balanced aluminum 6-inch diameter x 3½-inch face pulley. High quality, sealed, lifetime-lubricated precision ball bearings are employed. The construction of the unit also includes a convenient tension release lever for quick and easy belt changes; spring loaded belt tension adjustment operated by a hand screw knob; and hand screw-operated positive belt tracking adjustment. The backstand is available for left or right-hand operation.

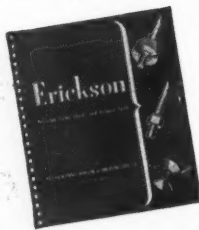
Schauer Type NA2B-V Speed Lathe

Designed to provide a unique method for polishing and finishing stainless steel, copper and aluminum bowls, discs, plates, reflectors, and so on, the Schauer Type NA2B-V Speed Lathe illustrated herewith, product of the Schauer Machine Co., 2060 Reading Rd., Cincinnati 2, Ohio, utilizes a vacuum-type holding fixture which



✓ New ERICKSON Adjustable Holder

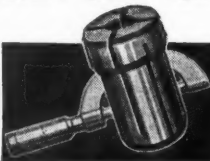
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Redesigned for heavier jobs, Erickson's Adjustable Floating Holder for Brown & Sharpe "00" Automatics has huskier flanges and adjusting screws. Longer wear and endurance; increased accuracy; overhang reduced to 27/32"; greater rigidity with

maximum clearance. Same collet is used, each collapsing 1/32" over-all. Holder grips solidly and uniformly throughout collet's length; permits stubbing, lengthens tool life. Range ¼" down to No. 80 (.013") drill. Erickson Tools Division, 2301 Hamilton Avenue, Cleveland 14.



ERICKSON = Collet Chuck Precision

is said to make possible the fast polishing of the entire surface of the object with an evenness of luster.

With the machine, the part to be polished is held in the fixture by a vacuum and is revolved. Various types and sizes of vacuum holding fixtures may be provided, depending upon the size and shape of the parts to be finished. The design of the fixture is said to eliminate the possibility of marring or distorting the workpiece, even if the latter is very thin.



Schauer Type NA2B-V Speed Lathe

The Schauer Type NA2B-V Speed Lathe may be equipped for either hand or foot operation of the motor and brake control. The brake is applied automatically the instant the power supply to the motor is cut off. The braking action is said to be smooth, stopping the motor quickly at high speed—a factor which contributes to a high rate of production.

Temco Temperature Controller and Indicator

A stepless input controller and temperature indicator has been added to its line of Temco equipment by the Thermo Elec-

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As transfer medium for transferring surface detail from one surface to another, where a conductive negative reproduction is desired as a foundation for electroforming to obtain metallic duplicate of original surface. Can be cast or sprayed against human tissues or other fragile materials without harm.

Joining of laboratory glassware for vacuum or pressure seal.

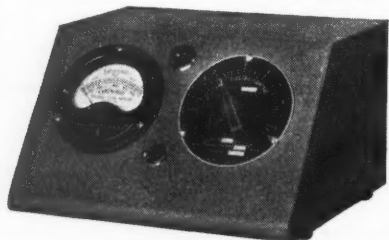
Many other applications. Describe your problem. Maybe we can give you the answer.

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DEPARTMENT 10

40 WALL STREET • NEW YORK 5, N. Y.

tric Manufacturing Co., 488 W. Locust St., Dubuque, Iowa. The instrument is designed for use with various makes of electric furnaces, ovens, melting pots, heating tanks, and other devices. Incorporated in the unit is a sensitive thermo-



Temco Temperature Controller and Indicator

static switch controlled by a knob on the instrument panel. The control knob can be set to regulate the current input into the heating equipment anywhere from 5 to 100 per cent time "on."

According to the manufacturer, the Temco Temperature Controller and Indicator is automatically compensating for

changes in line voltage and will maintain a constant watt hour input and even temperature hour after hour, regardless of wide voltage fluctuations. Moreover, only 5 to 20 watt hours are said to be required to operate the controller, thereby leaving practically all of the power to be consumed in useful load. The instrument includes a pyrometer calibrated in both Fahrenheit and Centigrade scales to 2,000 deg. F. and 1,100 deg. C. A 4-foot color-coded thermocouple of 14 gauge Chromel-Alumel is furnished. The instrument panel also houses a toggle switch and neon pilot light.

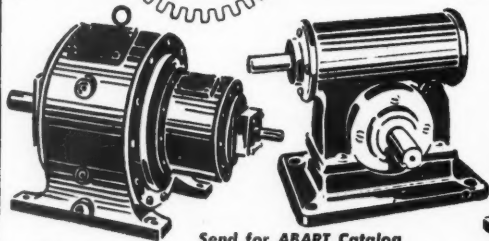
The Temco Temperature Controller and Indicator features a welded steel case with gray wrinkle finish and measures 9 inches wide x 5 inches high x 8 inches deep. The weight of the unit is 6 lb. Rubber feet and a metal bracket are supplied to allow for either desk or wall mounting of the instrument.

Fen Automatic Wrench

An automatic wrench consisting of a variable torque motor operating a retractable spindle is announced by the Fen Machine Co., 1350 Babbitt Rd., Dept. 38,

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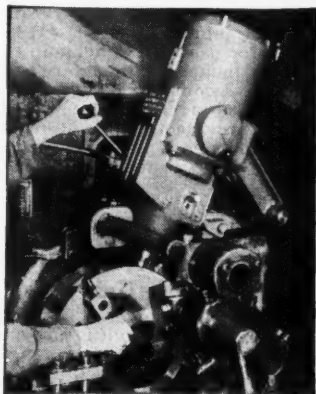
CHICAGO 50, ILLINOIS

Euclid, Ohio. The wrench is available in two models with maximum torque capacity of 4,000 and 6,000 inch-pounds respectively.

A selector wheel on the side of the housing enables the operator to select and maintain any desired torque from 0 to the maximum capacity of the unit. In this manner, the gripping pressure is regulated, thus allowing a light pressure for thin walled pieces and a heavy grip for heavier work. The downward movement of a hand control lever causes the wrench spindle to be engaged in the chuck pinion. Left and right movements of the same lever provide for operation of a momentary switch which energizes the motor for gripping or releasing the workpiece. A positive action brake can be applied in either direction of motor rotation to prevent overrun. In four-jaw chucking, each jaw may be advanced or retracted and the movement maintained within close limits. The operator can also "jog" each jaw until the proper working position of the workpiece is obtained.

According to the manufacturer, the Fen Automatic Wrench is not restricted to any preset limits but will move the chuck jaws to the full extent of their travel. The wrench is adaptable to many types and sizes of machines and is

mounted on a bracket provided for each specific type. Where the conventional mounting cannot be used, a right angle



Fen Automatic Wrench

drive head is provided which allows the wrench to be mounted horizontally and to engage chuck in a vertical direction.

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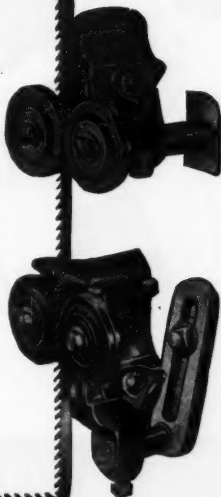
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BALL-BEARING

BAND SAW GUIDES



The Model 4M (4,000 inch-pound torque capacity) wrench is 22 $\frac{5}{8}$ inches long overall x 7 $\frac{1}{2}$ inches in diameter. The Model 6M (6,000 inch-pound torque capacity) wrench is 25 $\frac{1}{2}$ inches long overall x 9 inches in diameter. The Model 4M is recommended for use with chucks up to and including 12 inches in diameter, and the Model 6M is recommended for use with chucks 15 to 30 inches in diameter. Both models are provided with motors of 220 or 440-volt 60-cycle 3-phase design. Spindles are provided to fit chuck sockets as specified.

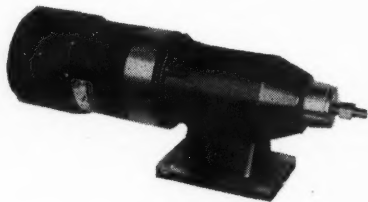
Govro-Nelson Model KT Automatic Tapping Unit

Identified as the Model KT, an automatic tapping unit having no clutch, gears, or lead screw has been developed by the Govro-Nelson Co., 1931 Antoinette St., Detroit 8, Mich. Centrifugal pressure provides the feed for automatically tapping any number of threads per inch. According to the manufacturer, the feed is so sensitive that the unit will tap 0-80 and $\frac{1}{4}$ -20 without adjustment. With an accurate tap, proper alignment and adjustment, the unit, it is claimed, will pro-

duce Class 4 threads.

The construction of the Govro-Nelson KT Automatic Tapping Unit includes 3-point ball bearing suspension and free-rolling centrifugal weights. The entire mechanism operates in an oil bath sealed to retain the oil and to prevent the entry of coolant.

The Model KT has a spindle speed of 1,725 r.p.m., a maximum stroke of 1 $\frac{1}{4}$



Govro-Nelson Model KT Automatic Tapping Unit

inches, and maximum collet capacity of $\frac{1}{4}$ inch, and is designed to handle tap sizes from 00-96 to $\frac{3}{8}$ -16, depending upon the material. The unit, which is self-contained and may be operated at any angle

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212 N. LAFLIN STREET, CHICAGO 7, ILLINOIS

with remote electrical controls, is so constructed that the tap idles in reverse but turns clockwise before moving toward the work.

Ideal Portable Electric Cleaner

Ideal Industries, Inc., 4004 Park Ave., Sycamore, Ill., announces a completely redesigned portable electric cleaner which, it is claimed, can be operated continuously 24 hours a day if necessary. The unit is available in two models; namely, a heavy duty model weighing 14½ lb. which is powered with a 1½ h.p. motor and is designed to blow air at a velocity of 25,500 feet per minute, and a medium duty model weighing 9½ lb.

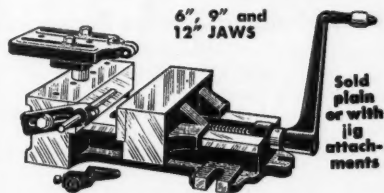


Ideal Portable Electric Cleaner

which is powered with a 2/3 h.p. motor and is designed to displace air at 19,000 feet per minute. Both models have precision type sealed ball bearings and air stream cooling scrolls which are said to permit continuous operation without overheating.

According to the manufacturer, the Ideal Portable Electric Cleaner can be used as a vacuum for removing dirt, dust, and grime from machinery, motors, generators, electrical apparatus, floors, benches, overhead pipes, and so on, or may be used as a sprayer for paint, varnish, lacquer, and so on. If a drying action is desired, a heater nozzle may be attached to the unit for raising the air flow temperature to a minimum of 85

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With special jaws and attachments this vise holds plain, round or odd shapes accurately for repeat-operation work on drill press, radial, shaper, planer, miller, grinder. Sizes to 124 lbs. Flush, square, parallel construction aids positioning against knees or angle plates.

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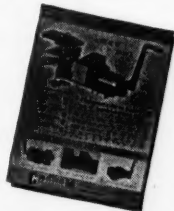
Many
patterns
using only
straight
knurls



Simply by adjusting the angle of ordinary straight knurls, this tool produces a wide variety of straight, spiral and checkered patterns. Fits lathe turret (or tailstock). Capacity for work up to 2½" dia.

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details of
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GRAHAM MFG. CO.

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EAST GREENWICH, R. I.

deg., thus making it useful in drying motor windings and electrical equipment to prevent shorts and corrosion, as well as in drying paint, ink, and so on.

Behr-Manning Service Packaging Plan

The Behr-Manning Corp., Troy, N. Y., announces a trade-built repackaging plan for coated abrasives, effective on shipments after January 1948. The plan is described by the company as a planned "tailored" method of packaging coated abrasives in such proper quantities, weights, and invoice values and in such readily identified containers and wrappers as to best serve the functional needs and habits of its distributors, dealers, and consumers alike.

Said to provide for maximum economy and convenience in the buying, selling, handling, and use of coated abrasives, the Behr-Manning Service Packaging Plan is claimed to offer the following advantages: (1) new decimal quantities, (2) new standard master packages, (3) new component resale packages, (4) brand identification by colored labels, and (5) line identification by wrapper design.

MEINHARDT

DIAMOND TINED DRESSING TOOLS

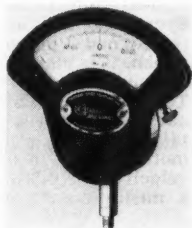
*Finest Industrial Diamonds
Set by The Process*

*Assure Longer Life
Cut Cleaner—Faster
Any Type Grinding
Gems of Industry*

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2810 Milwaukee Ave. Chicago 18, Ill.

"Micronar" Dial Indicator

Designated as the "Micronar," a quadrant type dial indicator having standard mounting dimensions, thus making it suitable for use on comparators and fixtures for controlling unusually close tolerances, is announced by the Standard Gage Co., Poughkeepsie, N. Y. According to the manufacturer, the unit has an unusually high amplification ratio for an instrument of the dial indicator type. The scale of the English unit model is divided into 0.0001-inch steps and in the central portion these intervals have been subdivided to 0.00002 inch. The effective range of the indicator is said to be 0.0018 inch.



"Micronar" Dial Indicator

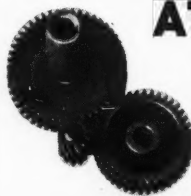
An outstanding feature of the Micronar Dial Indicator is the lightweight hand

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which is claimed to be instantly responsive and to reach its final position without noticeable fluttering. The dial is rotatable over a small angle by means of a fine adjusting screw which facilitates setting the instrument to a standard. The Micronar is regularly furnished with a sapphire-tipped contact point for wear resistance. In addition to the English model, the indicator is available in a metric model graduated in 0.001 mm. and having a range of 0.04 millimeter.

Johnson No. 1019 Metal Melting Furnace

The Johnson Gas Appliance Co., Cedar Rapids, Ia., announces the addition to its line of industrial furnaces of a metal melting furnace designed for melting



Johnson No. 1019 Metal Melting Furnace

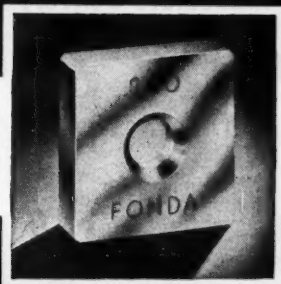
lead, tin, zinc, pot metal, aluminum, and so on. Designated as the No. 1019, the furnace includes nine burners, each equipped with a separate valve and pilot light, thus permitting the use of as many burners as required.

The Johnson No. 1019 Metal Melting Furnace has a capacity for 1,000 lb. of lead and is designed to provide pot temperatures of up to 1,400 deg. F. The furnace is heavily insulated to reduce heat loss and can be furnished with automatic temperature controls. A removable cast iron pot with lifting hooks is standard equipment of the furnace.

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Taylor-Winfield Non-Synchronous Welder Control

A non-synchronous control designed for foot, air, motor, and hydraulically-operated spot, projection, butt, and seam resistance welders is announced by The Taylor-Winfield Corp., Warren, Ohio. The unit features a smooth, exterior with no projecting knobs or handles; dead-front panel; easily-read graduated dials; piano-type door hinges; drip-proof ventilating louvers; and name plates with full reference data.

Accurate timing is provided by d.c. timing circuits which operate on closely regulated bias and timing voltages to compensate for wide variations in power supply voltage. Accurate setting of timing is said to be made possible by: (1) timing dials graduated with wide range at short time settings; (2) timing dials graduated in cycles for each frequency (60, 50, and 25 cycles per second); and (3) timer for pulsation welding having the dial reading directly in number of pulses desired.

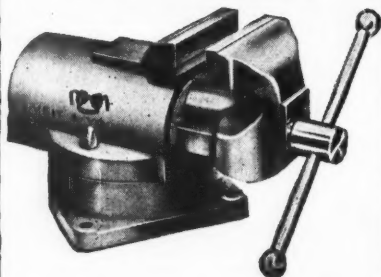
Control units are readily accessible through the large side door of the cabinet. The panel on which the components are mounted is designed to swing forward for ease of checking or servicing. Marked terminal strips and lead tabs, together with prepared test points and circuit points, provide for efficient trouble shooting. Plug-in type connections make possible quick changing of timing panels and power chassis. Drainage is provided in the bottom of the enclosing case for any condensation from the water cooling circuit.

The Taylor-Winfield Non-Synchronous Welder Control is available as a NEMA Type 1A weld timer and as NEMA Types N2 and N3 combination controls, each consisting of a sequence-weld timer and ignition contactor.



Taylor-Winfield NEMA Type N2 Combination Non-Synchronous Control

TOOL ROOM VISES Immediate Delivery



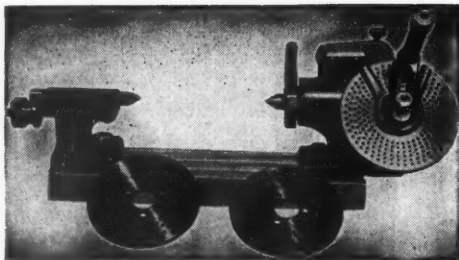
Long guides for jaws provide strong grip. Easy swivel. Jaws: 3½", 4¼", 5" open to 5", 6", 8".

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6" PLAIN DIVIDING HEAD

Spindle has No. 7 B & S taper and take-up collar for end thrust. Plates cover entire range of B & S chart. Complete with 3 dividing plates 4" dia., one 24-notch indexing plate (not supplied with other makes of 6" heads) and tailstock. Write for folder of machines and attachments.

Immediate shipment from Stock

JEFFERSON MACHINE TOOL CO.

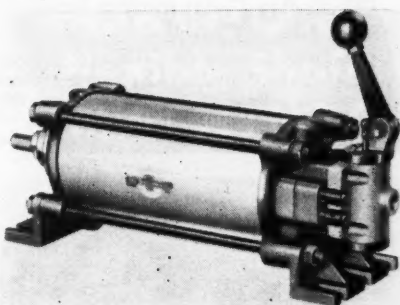
702 West 4th St., Cincinnati 3, Ohio

Bellows Model BM15 Air Motor

A heavy type, powerful air motor, embodying an integral valve design, designated as the Model BM15, has been added to the line of air motors produced by The Bellows Co., 222 W. Market St., Akron, Ohio. The valve operating lever is adjustable to work from any angle in any plane. Easily adjustable controls to regulate the speed of the piston in either or both directions are integral with the motor itself, thereby eliminating the necessity of adding special speed control valves to the air line. Only one air connection is required and that may be a flexible hose.

The Model BM15, with its 4½-inch bore, is said to develop a piston thrust of 15 times air line pressure from any given line pressure up to 175 p.s.i. The unit is available in stroke lengths of 1½, 3, 6, and 9 inches and also in virtually any stroke length on special order.

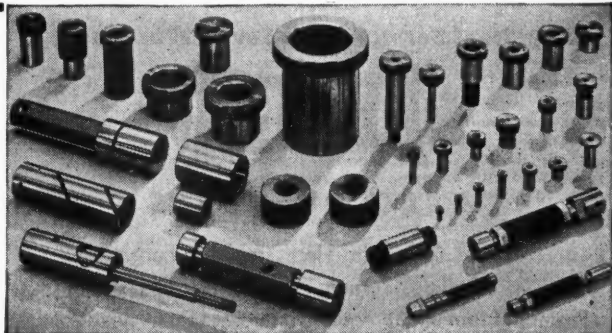
Precision built with forged steel heads, heavy brass cylinder, stainless steel piston rod, and corrosion-proof piston construction for low friction loss, the Bellows Model BM15 Air Motor is designed for long trouble-free operation and is available in many different styles, including pivot mount, remote control pivot



Bellows Model BM15 Air Motor

mount, solenoid operated, remote control solenoid operated, and remote control manually operated, as well as standard foot mount units. The motor can be easily synchronized to any machine movement by cam linkage, or electrical controls. Compactly constructed and simple in design and operation, the Model BM15 can be quickly incorporated into production processes to perform an unusually wide range of work.

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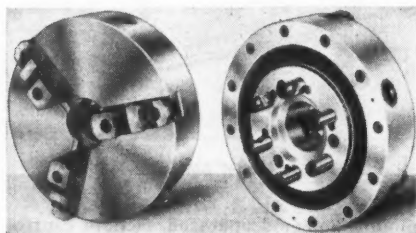
ECONOMY TOOL & MACHINE CO.

1829 S. 68TH STREET

MILWAUKEE 14, WIS.

"Whit-Aloy" Aluminum Body Chuck

Claimed to possess the strength of steel and the wearing qualities of cast iron but with the lightness of aluminum, a chuck featuring an aluminum body made of special analysis aluminum known as



"Whit-Aloy" Aluminum Body Chuck

"Whit-Aloy" has been developed by The Whiton Machine Co., 505 Howard St., New London, Conn. As a result of its lack of excessive weight, the chuck starts and stops quickly and eliminates drag.

Designed for correct mounting on American standard spindle nose Type D-1, the Whit-Aloy Aluminum Body Chuck is hand operated and includes jaws, scroll, and pinion made of heat-treated alloy steels. The chuck is supplied complete with a suitable heat-treated alloy steel wrench, as well as the necessary number of cam lock studs.

"Lusol" Coolant Concentrate

Known as "Lusol," a liquid concentrate for use with 10 to 75 parts of water in producing a coolant that is said to meet the requirements of present-day high speed production on tough alloys has been developed by the Anderson Oil Co., Inc., 506 Brownstone Ave., Portland, Conn. According to the manufacturer, Lusol, when used with 10 to 75 parts of water, makes a true solution and not an emulsion, and does not evaporate or become rancid.

Lusol, it is claimed, has a low interfacial tension which enables it to penetrate between the tool and the chip with unusual rapidity and thereby prevent the formation of heat. Moreover, the material is said to provide for unusually long tool

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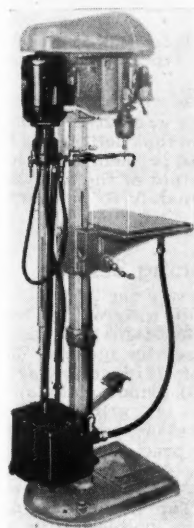
life, cool and clean work, and the obtaining of unusually close tolerances, and is claimed to handle easily without harmful effects.

Procnier Universal Tapping Machine with Continuous Flow Lubricating Pump

A continuous flow lubricating pump, known as the "Hi-Boy," is one of the principal features of a universal tapping machine now being marketed by the Procnier Safety Chuck Co., 18 S. Clinton St., Chicago 6, Ill. The pump is of the motor-driven gear type and provides a continuous flow of

lubricant to the tap. Lubricant is supplied to the tap while the tap is "backing out" as well as during the tapping operation. This continuous flow of lubricant is said to be particularly helpful in taking unusually deep cuts and in the tapping of unusually tough metals where proper lubrication is essential. In addition, the continuous flow of lubricant provided by the pump is claimed to wash fixtures clean of chips and shavings.

Tap driving and reversing pressures on the Procnier Universal Tapping Machine are preset by long compensating springs which are said to maintain proper pressure for tapping regardless of pressure on the foot pedal. In this man-

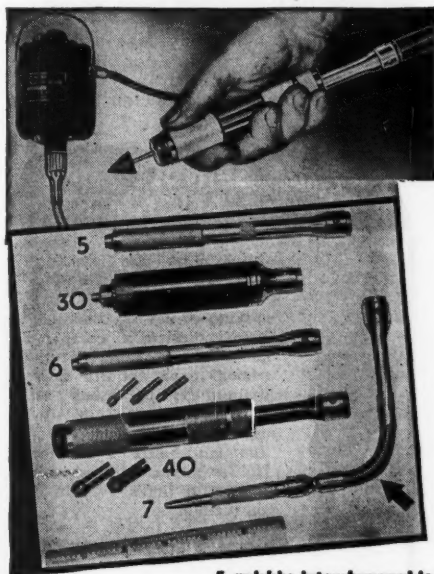


Procnier Universal Continuous Flow Tapping Machine with Lubricating Pump

ner, high speed, uniformly accurate tapping with a minimum of tap breakage or spoiled work is assured.

The Procnier Universal Tapping Machine is made in two sizes: Series "A" with capacity of from a No. 2 tap up to $\frac{1}{8}$ inch in steel, $\frac{3}{8}$ inch on cast iron, and $\frac{1}{2}$ inch in brass; and Series "D" with capacity of from a No. 10 tap up to $\frac{1}{2}$ inch in steel, $\frac{5}{8}$ inch in cast iron, and $\frac{3}{4}$ inch in brass.

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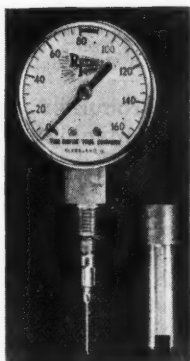
27 PARK PLACE • NEW YORK 7, N. Y.

Rotor MSK-55 Needle Type Pressure Gage

Designed to indicate the actual air pressure at an air tool while the tool is operating, a needle type pressure gage designated as the MSK-55 is announced by The Rotor Tool Co., Cleveland, Ohio. The construction of the gage includes a hollow needle (hypodermic type) with a sharp tapered point and fastened in an adapter that fits onto a taper on the base of the gage. When not in use, the needle is protected by a sleeve which has a slot

in the end to aid in removing the needle.

The Rotor MSK-55 Needle Type Pressure Gage is furnished with a leather carrying case having instruction tag attached. In use, the gage is inserted in the air hose, usually with the hose bent, so that it indicates the pressure in the hose at the end of the tool while the tool is under full load. This pressure, on account of restrictions in the air line, fittings, or hose, may be entirely different from that shown on the gage at the compressor. Thus, if the actual delivered air pressure has dropped 50 per cent near the tool, the production output of the tool has been reduced approximately 50 per cent.



Rotor MSK-55 Needle Type Pressure Gage

Faster SPINDLE ALIGNMENT



On tapping and reaming jobs, the Ziegler Floating Tool Holder speeds the making of set-ups because it automatically compensates for alignment inaccuracies, even though they amount to as much as 1/32" radius or 1/16" diameter.

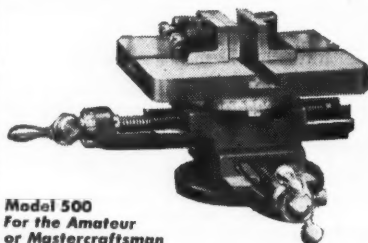
The man-hours a Ziegler Holder saves will pay for it several times over in a short time.

W. M. ZIEGLER TOOL CO.

1928 Twelfth St., Detroit 16, Mich.

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for Taps and Reamers...



Model 500
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or Mastercraftsman

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The Mastercraft Drill Press and Milling Table conforms to the exacting standards of best machine tool construction. A great time saver. Cuts keyways, special shapes, splines and innumerable other forms, and drills on a dead straight line or on a radius.

Write for circulars describing this model and 600, 700 and 800 Series for heavier work.

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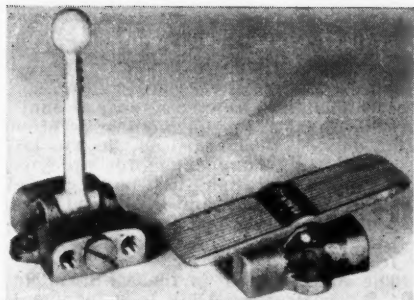
HOLLYWOOD 38

CALIFORNIA

reducing the tendency of some materials to load at the heel of the tap; (2) since the chip is curled tighter than the shape of the flute, ample space for lubrication to reach the point of the tap is provided, thereby helping to carry the heat away from the cutting edge and thus permitting the use of high tapping speeds; (3) the rake angle is held within ± 1 -deg. limits; (4) the hook angle is equalized, thereby balancing the side pressure on the tap and thus reducing runout and the possibility of cutting oversize; and (5) the reconditioned taps promote maximum consistency of tap hole size and thus make possible the planning of the correct tap size in advance without the necessity of the trial and error method of setup on the job.

Ross Small Poppet Type Valve

The Ross Operating Valve Co., Dept. K, 6484 Epworth Blvd., Detroit 10, Mich., has introduced a small poppet type valve designed expressly for the operation of light machine tools, vises, fixtures, presses, and other machinery adaptable to air control. The valve is constructed of brass and stainless steel with a Hi-



Ross Small Poppet Type Valve

Carb Neoprene valve seat, and is available with either a hand lever or foot lever, the vertical lever action being suited for small machine tool installations.

In the foot treadle style, the valve is available in 3 and 4-way models designated as the Nos. 600 and 601 respectively. In the hand lever type, the valve is available in 3 and 4-way models designated as the Nos. 602 and 603. All models are available in locking, non-locking, or neutral-position types.

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PATENT ADJUSTABLE HOLLOW MILLING TOOL

Quickly and easily adjusted — rugged in construction — rigidly locked when on the job.

Carbide tipped blades optional, are quickly interchanged with the high speed steel blades, for cutting the harder or gritty materials.

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Gloucester City

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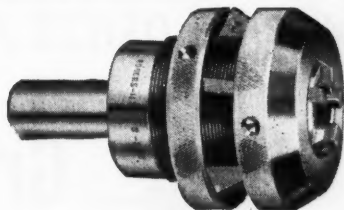


Fig. 20—Shank Integral

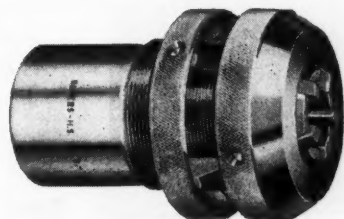


Fig. 23—Arbor Separate

All-State 111 Silver-Brazing Alloy

The All-State Welding Alloys Co., Inc., 96 W. Post Rd., White Plains, N. Y., announces the availability of a silver solder which is said to have a shear strength of 105,000 p.s.i. and a melting point of 1,076 deg. F. Designated as the No. 111, the alloy is recommended for applying high speed tool tips that have critical temperature ranges and is claimed to be especially suitable for the fabrication and repair of equipment in the electrical and refrigeration industries.

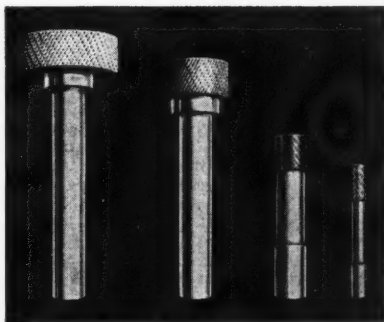
The silver content of the All-State No. 111 Silver-Brazing Alloy is 40 per cent, with the remainder made up of cadmium, copper, and zinc. The alloy is available in wire, strip, or ring form.

Ford Carbide Grinding Bur

A carbide grinding bur for internal grinding, jig grinding, and blending or fine finishing by off-hand grinding has been announced by the M. A. Ford Manufacturing Co., Inc., 780 W. First St., Davenport, Ia. The tool is said to work equally well on soft materials or on steels hardened to 65 Rockwell C.

Precision ground on special machines

so as to produce a uniform and truly concentric tool which provides maximum cutting efficiency, the Ford Carbide Grinding Bur is designed to hold hole shape and tolerances without dressing or



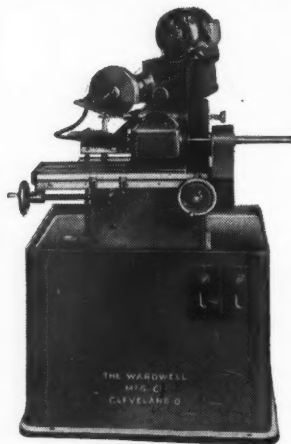
Ford Carbide Grinding Burs

set-up adjustments, and is available in standard sizes from $\frac{1}{16}$ to $\frac{3}{4}$ -inch tool diameter for operation in precision grinding equipment at conventional speeds.

CARBIDE DRILLS FLUTED

... indexes automatically

Grinds from solid



Wardwell 90 F.S.
Fluting Grinder

Grinds and sharpens taps, drills, reamers, milling cutters, end mills and saws $1/16$ " to 12" diameter. Grinding angles 45° to 90° ; adjustable to 1 turn in $5/16$ " of length. Sharpens saws in gangs up to $7\frac{3}{4}$ " long. Write for Bulletin 90 F.S.

THE WARDWELL MFG. CO.

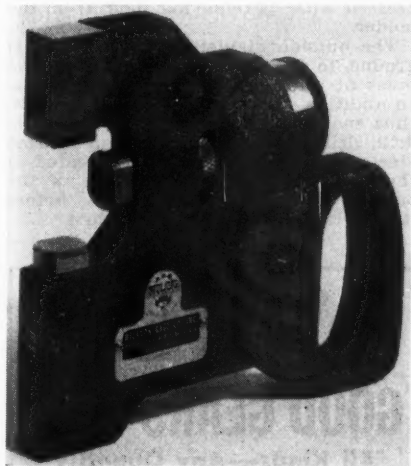
3166 FULTON ROAD

CLEVELAND 9, OHIO

Nilco Dial Snap Gage

Product of the Nilsson Gage Co., Inc., Poughkeepsie, N. Y., the Nilco Dial Snap Gage illustrated herewith features a framework machined from rolled magnesium with angles at 45 deg. to provide maximum rigidity and to minimize dimensional changes caused by variations in temperature fluctuations. The gage also features a vernier type adjusting screw which permits 1/4-inch adjustments to be made in the gaging pin or movable anvil. The adjustment can be locked with the gaging pin still remaining free for checking.

The construction of the Nilco Dial Snap Gage allows for the use of a solid



Nilco Dial Snap Gage

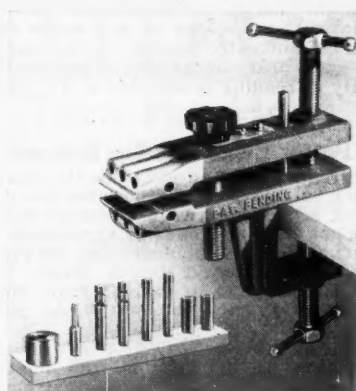
upper anvil block which is claimed to ensure absolute parallelism at any setting throughout the entire range of the gage. In addition, the gage is said to provide a correct reading as soon as it is applied without the need of rocking back and forth. Moreover, to minimize friction, ensure super-sensitivity, and increase service life, the gage utilizes a cam actuated rotatable plunger equipped with needle point bearings to transmit the travel from gaging pin to indicator.

According to the manufacturer, the Nilco Dial Snap Gage is completely shockproof in every respect and cannot be damaged in the hands of inexperienced operators. Nor is there said to be

BENCH KING

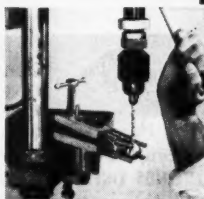
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any loss of accuracy in its mechanism since the gage, it is claimed, will always repeat in exact accordance with the accuracy of the indicator. Simplicity of design makes possible the use of few parts requiring replacement, and, when cleaning is required, the gage can be taken apart and reassembled in a matter of minutes. In the event of special application, the use of the rotatable plunger facilitates the checking of any depth and, with the indicator located at the rear of the gage near the handle, complete visibility of reading is afforded at all times.

Porter Electrode Tip Dresser

Introduction of an electrode tip dresser which is said to make possible the precision dressing of worn electrode points in a matter of seconds is announced by the C. O. Porter Machinery Co., 666 Front Ave., N. W., Grand Rapids, Mich. The tool is adaptable to portable gun, short stroke stationary, and multiple point welders.

The principal feature of the Porter Electrode Tip Dresser is the floating cutter blade which is made of extremely hard Tan-Tung steel. The blade floats in the chuck body, effecting a uniform cut-



Porter Electrode Tip Dresser

ting action on both edges and correct centering of the electrode as the tip is reshaped. The compact construction of the dresser permits worn electrodes to be dressed without removing them from the holder.

The outside diameter of the chuck is ground to 0.8755-0.8765 inch and can be press fit into most power dressing tools. In addition, the chuck is threaded $\frac{3}{8}$ -24, thus enabling it to be used on a portable drill, drill press, or lathe. A high speed steel cutter ring is also incorporated in the tool for the proper dressing of the outside diameter of the electrode before it is actually floated into the tool.

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A Heavy Hogging, Non-Chattering Replacement for Fixed Core Drills

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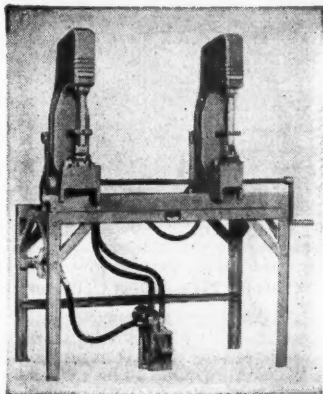
Attractive Proposition for Representatives

LINCOLN PARK MANUFACTURING CO.
3304 Dix Road Lincoln Park, Mich.

Air-Hydraulic Multiple Press Unit

A multiple press unit which can be readily adjusted to perform 2, 3, 4, or more operations simultaneously under one valve control is now being marketed by Air-Hydraulics, Inc., 401 Broadway, New York 13, N. Y. The distance between the presses may be adjusted to suit the need. One press may be tooled for blanking, another for crimping, a third for stamping, and so on.

According to the manufacturer, the Air-Hydraulic Multiple Press Unit is ideal for women operators since it operates noiselessly without operator fatigue.



Air-Hydraulic Multiple Press Unit

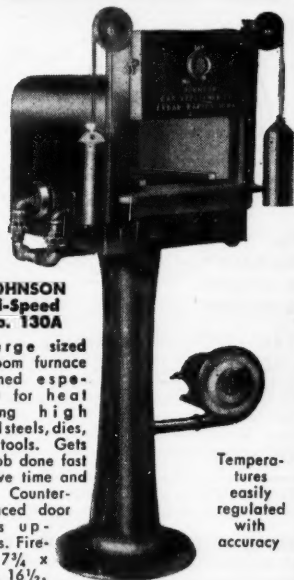
Since the pressure is applied by squeeze, impact shock damage is claimed to be eliminated. The unit is available in two sizes, delivering the most delicate pressure up to either $2\frac{1}{2}$ or 6 tons. The unit can be obtained with a foot control valve or with a solenoid-operated single push-button control. A timing device, adjustable ram, adjustable platen, and other accessories are available.

Alox 162 Oil Additive

Announcement has been made by the Alox Corp., 3936 Buffalo Ave., Niagara Falls, N. Y., of a universal oil additive which is claimed to improve the lubricity of all types of lubricating oils and to increase their life under high temperatures and high pressures. Designated as Alox 162, the compound is said to provide the necessary wetting characteristics for the

Quick Acting JOHNSON FURNACES

Turn the Heat ON HIGH SPEED STEELS



JOHNSON
Hi-Speed
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A large sized toolroom furnace designed especially for heat treating high speed steels, dies, and tools. Gets the job done fast to save time and gas. Counter-balanced door opens up-wards. Fire-box $7\frac{3}{4}$ x 13 x $16\frac{1}{2}$. Complete

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571 E Ave. N. W., Cedar Rapids, Iowa

oil to completely coat the bearing surface with a closely bonded, continuous film to prevent corrosion.

In the gear lubrication field, Alox 162 is said to reduce temperatures and meet the needs of pressure lubrication. In the Diesel engine, the improved lubricity is claimed to prevent undue wear of bearings and scuffing and scoring of pistons. In the railroad field, the compound, mixed in the journal oil, is reported to have practically eliminated hot boxes, stopped corrosion of bearings in idle cars, and provided for easier starting on long trains.

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NEW, AMAZING MACHINING TECHNIQUE

YOUNG PRECISION EXPANDING MANDRELS FOR PRODUCTION OR INSPECTION

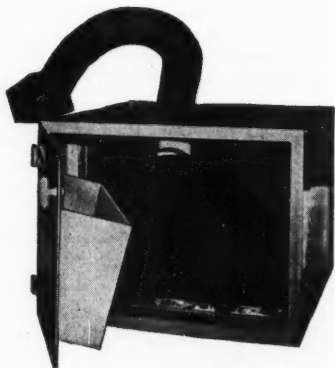
Curtiss-Wright Corporation ranks our product with their best tools. Cleveland Graphite Bronze Company, leading bearing manufacturer, states new high accuracy reached, plus substantial production boosts.

ROUGHLY SKETCH DESIRED MANDREL INTO YOUR PART PRINT AND FORWARD FOR QUOTES.

YOUNG ARBOR CO. • PH. YE-9784
3257 BRADFORD RD., CLEVELAND HTS. 18, OHIO

Colonial Type S Dust Collector

Recommended for machines which are used intermittently, a dust collector which is substantially constructed with angle iron framing and heavy gauge steel and is completely self-contained in a box 20 x 22 x 16 inches is announced by the Colonial Blower Co., 17 Francis Ave., Hartford, Conn. The front of the box is



Colonial Type S Dust Collector

a hinged door which permits easy access for removing dirt, changing filters, or for inspection. The back of the box is a heavy plate on which is mounted the power unit. This plate can be removed and placed on a bench or table for working convenience if changes or repairs are necessary.

Designated as the Type S, the dust collector, according to the manufacturer, has a capacity of 325 c.f.m. at 3 1/4-inch w.g. and will produce a static suction of 2-inch w.g. in a suction nozzle with 4 feet of 3-inch diameter flexible metal

This

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No. 000 ANGLE VISE
For Milling, Drilling, Etc.
Solve Difficult Angle Jobs.
Get QUICK, ACCURATE, SET-UPS and save time, money, rejects. Accurately machined and graduated to full 90°. Also use horizontal. Steel Jaws 2 1/2" plain or grooved.

Combination—Can't Be Beat!

No. 83 ROTARY TABLE
With Dual Cross Feeds
For Drill Press, Lathe or Milling Machine. Combines Indexing, Milling and Rotary Table.
Accurate and speedy — strong and sturdy. Rotary Feed calibrated in degrees, cross feed in thousandths. Low price. Get facts.

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CHICAGO TOOL AND ENGINEERING CO.
8399 S. Chicago Ave. Chicago 17, Ill. Phone-Saginaw 9675

hose. Powered with a $\frac{1}{2}$ h.p. motor, the unit can be used to serve surface grinders, tool grinders, and other isolated machines which cannot readily be connected to an exhaust system.

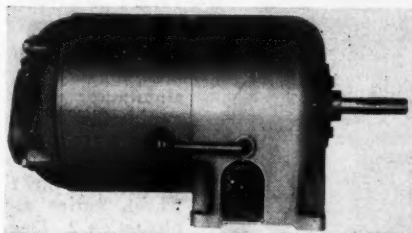
Gulf Improved Cutting Oils

Improved cutting oils which are said to combine extremely active sulphur content with the absence of disagreeable odor are announced by the Gulf Oil Corp., Gulf Bldg., Pittsburgh, Pa. Among the oils which have been improved are Gulf Lasupar Cutting Oil, Electro Cutting Oil, and L. S. Cutting Base.

According to the manufacturer, the sulphur in the above oils is chemically combined by an exclusive process so that it is uniquely active over the entire range of a cutting operation. Their efficiency is ascribed to the fact that the amount of chemically active sulphur, rather than the total percentage of sulphur contained, governs cutting oil performance. The overcoming of disagreeable odor makes available the advantages of these highly chemically-active sulphur oils to all types of operations with the assurance of pleasant operating conditions.

Lima Type R Gearshift Drive with Integrally Mounted Single-Phase Motor

The Lima Electric Co., 101 Findlay Rd., Lima, Ohio, announces that its Type R Four-Speed Gearshift Drive is now



Lima Type R Gearshift Drive with Integrally Mounted Single-Phase Motor

available with an integrally mounted single-phase motor. The unit is designed to drive machinery requiring selective speeds and is available in sizes of $\frac{1}{2}$ h.p. at 1,200 r.p.m. and $\frac{3}{4}$ h.p. at 1,800 r.p.m.

Order Them Together

STITES CAMS AND TOOLS for Screw Machine Products

One source of supply and responsibility for your Brown & Sharpe cams and circular form tools is a definite advantage.

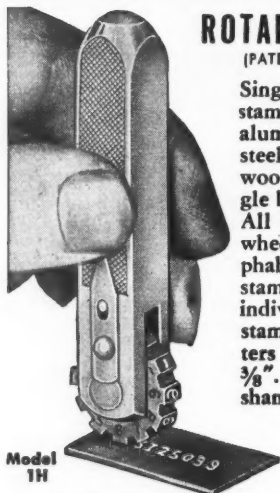
This is available at the Stites Tool Company where years of experience assures quality, accuracy and prompt service.

Here's one more priceless ingredient—Personal Service. Ask any Stites customer or better yet, try it yourself.



THE STITES TOOL CO.

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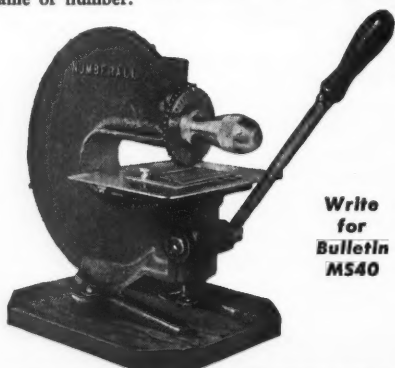
(PATENTED)

Single wheel, for stamping on brass, aluminum, soft steel, plastic and wood, with a single hammer blow. All figures on 1 wheel, entire alphabet on 2. One stamp replaces 12 individual, hand stamps. Characters from $\frac{1}{16}$ " to $\frac{3}{8}$ ". Also with shank for press.

Bulletin
MS-1H.

NAME PLATE DETAIL PRESS

Model 40 is for stamping details on name plates. Eliminates irregular and unsightly stamping on name plates, tags, etc. Available in $\frac{1}{16}$ ", $\frac{1}{8}$ ", $\frac{3}{16}$ " size characters. Dials contain all the letters and figures, diagonal line, and sign, dash, period. No experienced operator required. Steel, zinc, brass, fiber, etc., can be indented with a name or number.



Write
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Bulletin
MS40

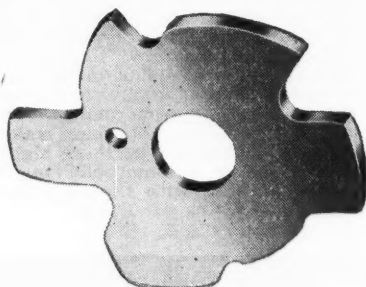
NUMBERALL STAMP & TOOL CO.
HUGUENOT PARK STATEN ISLAND 12, N. Y.

Gear ratios of the Type R are 1 to 1, 1.33 to 1, 2 to 1, and 4 to 1.

The Lima Type R Single-Phase Gear-shift Drive can be operated on 115 and 230 volts, 50 and 60-cycle a.c. Mechanically, the single-phase and polyphase units are identical.

Alco Automatic Screw Machine Cam

Properly hardened to provide for long service, a cam for Brown & Sharpe automatic screw machines is now being produced by The Alco Tool Co., 152 Birdseye St. Bridgeport 4, Conn. Designed for long production without adjustments, the cam



Alco Automatic Screw Machine Cam

features lobes that are said to be milled to exact tolerances.

The Alco Automatic Screw Machine Cam is available for machine sizes from 00 to 6. Rotating, slotting, and burring cams can also be furnished.

Thermo-dip N.S. Plastic Packaging

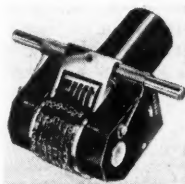
Designated as Thermo-dip N.S., a hot melt compound for protecting machine tools, cutting gears, and so on, from corrosion, abrasion, and the hazards of shipping and handling has been announced by Eronel Industries, 5714 W. Pico Blvd., Los Angeles, Calif. The material is pale amber in color and is transparent, thus enabling identifying marks on products to be easily read. Easily removed by stripping, the material can be reused repeatedly and is said to maintain its flexibility and properties over extended periods.

According to the manufacturer, Ther-

mo-dip N.S. has excellent resistance to salt water, high humidity, low temperature, and so on, and is unusually resistant to shock, cut-through, and abrasion.

Force Model 23 Indenting Numbering Head

Designated as the Model 23, an indenting numbering head with ebony finish which is said to prevent corrosion of the head has been developed by Wm. A. Force & Co., 216 Nichols Ave., Brooklyn 8, N. Y. The head can be adapted for either automatic or non-automatic, hand or power press operation for serially numbering metal, plastic, and numerous other materials.



Force Model 23 Indenting Numbering Head

Sprayweld Hard-Facing Method

A method for hard-facing by using a metallizing gun and Metco-Weld H, a "wire" composed of a powdered hard-facing alloy extruded with a plastic binder, is announced by the Metallizing Engineering Co., Long Island City, N. Y. Designated as the Sprayweld, the method, it is claimed, provides for the application of smooth, uniform, relatively thin hard coatings in a highly practical and economical manner.

During the spraying operation, the plastic binder is completely volatilized, and the deposit consists entirely of the metallic constituent. Subsequent fusing, with any fusing torch or with an attachment on a Metco metallizing gun, results in a coating alloyed to the base and physically and chemically identical to hard-facings of the same alloy applied by other methods, it is stated.

The alloy used in Metco-Weld H is claimed to possess excellent resistance to abrasion and to provide maximum resistance to corrosion. It combines a low-melting point with a long range of plasticity (1,850 to 2,050 deg. F.) and is said to have high strength at red heat and unusual resistance to oxidation.

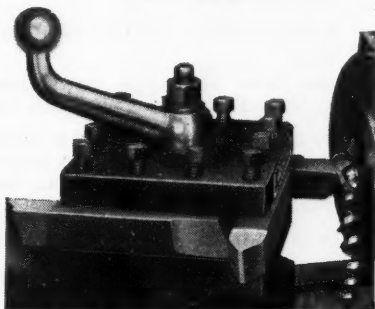
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Enco LATHE TURRETS

Enco Lathe Turrets re-index to the same position within five ten thousandths. Piece after piece can be machined with complete confidence in production precision.

There are no pins or bushings in Enco Toolpost Turrets to wear "egg shaped" or out of alignment. This ability to "come back" accurately makes Enco users come back for more turrets.

Mention your lathes, swing and tool size when you ask for the "30 Models Catalog"

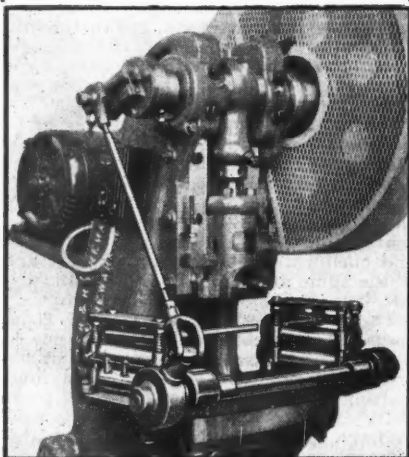


- 12 POSITION INDEXING
- 3 WORKING POSITIONS FOR EACH TOOL
- HARDENED STEEL CONSTRUCTION
- MOUNTS RIGIDLY IN COMPOUND T-SLOT
- KEEPS SETTING ACCURATELY
- INDEXING IS SELF-CONTAINED. ELIMINATES ALL CHIP INTERFERENCE

ENCO MANUFACTURING COMPANY

Dept. 111 — 4522-24 W. Fullerton Ave., Chicago 39, Illinois

LA BAHN Automatic ROLL FEEDS



LA BAHN double roll feed illustrated.

- **COST NO MORE THAN OTHER COMPARABLE FEEDS**
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Standard units provide up to 18" advance. Larger feeds with longer advance can be supplied.

We also manufacture stock reels, stock straighteners, wire straighteners and scrap cutters.

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**LA BAHN
MACHINE AND MFG. CO.**

544 Lincoln Highway, * Menlo Park, N. J.

Holden Automatic Oil Refiner

Said to enable industrial plants to save up to 90 per cent of their present lubricating oil costs, the Holden Automatic Oil Refiner illustrated herewith is now being marketed by The Holden Co., Buffalo, N. Y. According to the manufacturer, all types of dirty lubricating oil ordinarily discarded, including crankcase oil from trucks, gasoline motors, and automobiles, may be completely and economically re-refined in the user's own shop with the unit which automatically removes all impurities in the dirty lubricating oil in 20 minutes; thus, handling 3½ gallons per batch, it has a capacity of nearly 90 gallons per 8-hour day.

Simple to operate, the Holden Automatic Oil Refiner utilizes a specially devel-



Holden Automatic Oil Refiner

oped, economical catalyst and filter. Once the unit is loaded and a button is pressed, the oil is re-refined by an automatic process involving vacuum distillation and filtration under vacuum. When the batch has been re-refined, the unit shuts off automatically. The equipment is not only designed to remove all foreign solids such as dirt, dust, carbon, sludge, grit, abrasives, and metal particles but also to re-

move foreign liquids such as gasoline, kerosene, sulphuric acid, and water. The lubricating quality of the re-refined oil is said to equal or exceed that of new oil and to meet S.A.E. requirements.

The Holden Automatic Oil Refiner is 25 inches in diameter x 44 inches in height and weighs 300 lb. It is mounted on casters so as to make it readily portable, and can be operated on either 110 or 220 volts, 60-cycle current.

Hi-Power Model 77 Portable Electric Drill

Designated as the Hi-Power Model 77, a lightweight portable electric drill which is said to be ideal for industry, shop, and home workshop has been announced by Portable Electric Tools, Inc., 255-59 W. 79th St., Chicago 20, Ill. Outstanding features of the tool include a comfortable pistol grip handle with trigger switch control and newly designed air-cooled universal a.c.-d.c. motor. Other features comprise a lightweight stator housing made of seamless aluminum tubing; screw-on drill chuck; oil retaining bronze bearing; and 6-foot heavy duty flexible



Hi-Power Model 77 Portable Electric Drill

rubber-covered cord with plug.

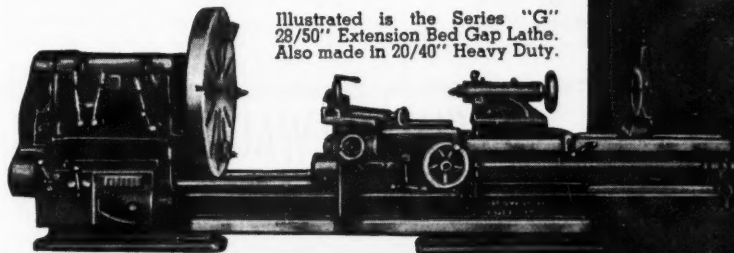
Designed to assure maximum power and long life together with the proper weight and size to ensure maximum ease of handling on any type of job, the Hi-Power Model 77 Portable Electric Drill has the following principal specifications: no-load speed, 1,700 r.p.m.; full-load speed, 900 r.p.m.; capacity, $\frac{1}{4}$ -inch drill in mild steel or hard wood; chuck, 3-jaw Brown & McLaren screw-on type (Jacobs Hand Tite chuck on request); overall length, 11 inches; body diameter, $2\frac{1}{4}$ inches; net weight, 3 lb. 8 oz.; and motor, 110 volt universal a.c.-d.c. (other voltages available on request).

Extension Bed Gap Lathes

The Extension Bed Gap Lathe is designed to be used either as a gap lathe or an engine lathe. We also manufacture a line of regular geared head engine lathes.

Write for circulars.

Illustrated is the Series "G"
28/50" Extension Bed Gap Lathe.
Also made in 20/40" Heavy Duty.

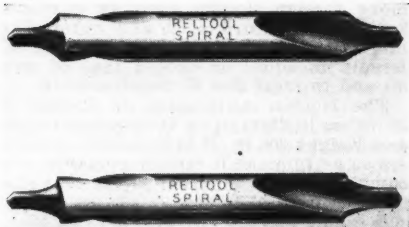


The Nebel Machine Tool Co.
CINCINNATI OHIO

Reltool Spiral Center Drill and Countersink

A spiral center drill and countersink featuring a design that is said to provide for long tool life and to reduce the frequency of regrinding to a minimum is announced by the Reltool Corp., Milwaukee, Wis. The tool includes a 22-deg. spiral which results in a shearing cutting action that is claimed to provide for the production of an unusually smooth hole. Moreover, the large open flute of the tool allows for fast, easy chip clearance.

In addition, the design of the Reltool



Reltool Spiral Center Drill and Countersink

Reduce Hand Finishing WITH WALTHAM Sub-Presses

Available in arch and overhanging types in 9 diameters, 10 sizes up to 6".



Arch Type Press

Alignment is attained for precision and clean work.

Lower costs through savings in time and effort.

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MACHINE
WORKS**

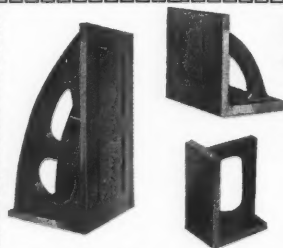
WALTHAM,
MASSACHUSETTS

Spiral Center Drill and Countersink includes a fillet at the point where the 60-deg. countersink angle meets the tip. This construction is said to eliminate stress and strain and thereby reduce tip breakage in centering operations. The tool is furnished with ground flutes, and its overall length is claimed to be slightly greater than that of conventional center drills.

Colmonoy Plastic Bonded Rod

For hard-facing with Colmonoy, the Wall Colmonoy Corp., 19345 John Rd., Detroit 3, Mich., announces the availability of plastic bonded rod in 5-lb. coils. According to the manufacturer, the rod, which is supplied in $\frac{1}{8}$ and $\frac{1}{4}$ -inch diameters, makes it possible to execute the Colmonoy Sprayweld Process using wire metallizing equipment which will handle wires of these diameters.

Colmonoy Plastic Bonded Rod is composed of powdered Colmonoy No. 6 combined with a plastic binder and extruded to the above sizes. As the rod passes through the flame of the metallizing gun, the plastic burns out, leaving the Colmonoy particles to deposit on the surface being sprayed. After the desired amount of



SPECIAL MILWAUKEE ANGLES

Manufactured by the makers of Milwaukee Surface Plates, these precision tools combine the same high-quality workmanship and the utmost durability. Sizes from 4" x 4" x 4" to 18" x 18" x 36".

Write for your catalogue today.

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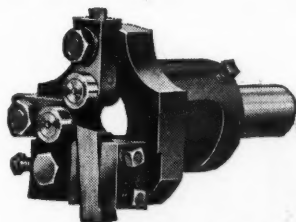
Engineers and Machinists Since 1907

126 E. Pittsburgh Ave., Milwaukee 4, Wisconsin

overlay has been applied (a minimum of 0.010 inch to a maximum of 0.125 inch), it is bonded to the base metal by means of a large oxygen acetylene torch, induction equipment, or a controlled atmosphere furnace. With any of these methods, the final result, it is claimed, is a molecular bond between the Colmonoy and the base metal identical to that obtained when the same alloy is applied in rod form.

Watson Tangent Cut Box Tool

The Watson Manufacturing Co., 2222 Albion St., Toledo 6, Ohio, is now marketing a general purpose tangent cut roller rest box tool of wide range for use in turning diameters from bar stock, castings, forgings, or other material.



Watson Tangent Cut Box Tool

Applicable to various types of screw, turret, and other machines, hand or automatic, the Watson Tangent Cut Box Tool is said to be simple to set, and is so constructed as to eliminate the need for resetting when it is necessary to grind the bit. A descriptive folder containing complete information on the tool is available from the company.

Airco Improved No. 312 Electrode

An all-position mild steel electrode designed to produce weld metal possessing not only excellent mechanical properties but also low hydrogen content, the Airco Improved No. 312 Electrode now being marketed by the Air Reduction Sales Co., 60 E. 42nd St., New York 17, N.Y., is said to have two advantages over its predecessor: (1) It can be used on alternating or direct reverse polarity current, operating characteristics being equally good on either a.c. or d.c. reverse; and (2) preheating of the electrode is no longer required with the improved electrode in

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**QUEEN CITY
MACHINE TOOL Co.**

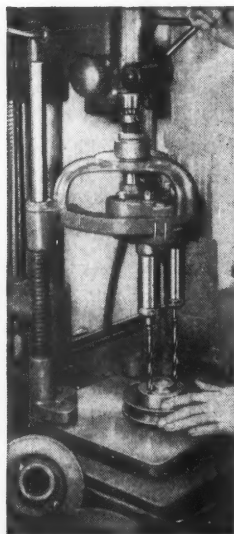
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LINDERME

USERS SAY:

Production UP ...

Costs DOWN!



2 HOLES • 1 STROKE

That's simple arithmetic with a LINDERME Two Spindle Adjustable Drill Head on the job. Here's a drill head low in price, high in productivity. Its versatility makes it a gold mine. Linderme Drill Head users in general and production machine shops, plastics fabricators and others report great savings

from a low initial investment... It's quickly set to variable centers from $\frac{1}{2}$ to 6", drill capacity up to $\frac{3}{4}$ ", adaptable to various tapping units. Models A and B for sleeve adaptation to drill press quills; Models C and D with "over-arm" arrangement, mounted on heavy ground base for use with drill fixtures.

Write for Bulletin containing complete details.

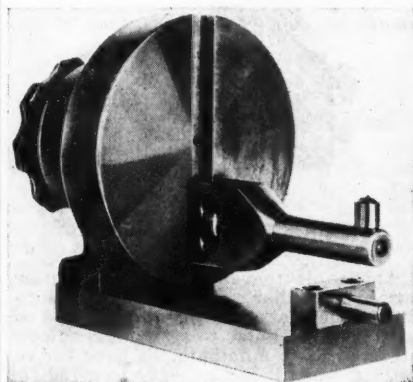
LINDERME
MACHINE & TOOL CO., INC.
12247 COYLE AVENUE
DETROIT 27, MICHIGAN

order to obtain porosity-free weld deposits since such deposits can be obtained by using either the stringer bead or the full weave technique.

Recommended uses for the Airco No. 312 Electrode include welding high sulphur free-machining steels; welding hardenable steels where no preheat is used; welding cold rolled steels; and weldments to be vitreous enameled after welding. The extremely low hydrogen content of the electrode is said to make possible the production of satisfactorily enameled surfaces without any heat treatment prior to enameling.

Montgomery Radius Emery Wheel Dresser

In response to the demand for an economical radius emery wheel dresser,



Montgomery Radius Emery Wheel Dresser

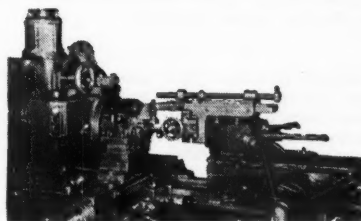
Montgomery & Co., 53 Park Pl., New York 7, N. Y., has added to its line of toolroom specialties the radius emery wheel dresser shown in the accompanying illustration.

According to the manufacturer, all concave radii up to and including $2\frac{1}{2}$ inches and all convex radii up to and including $1\frac{1}{2}$ inches can be dressed with the unit.

Reeve Turret Attachment

Said to facilitate the boring of tapers and profile holes with turret lathes and hand screw machines, the Reeve Turret Attachment shown in the accompanying

illustration is now being offered by the Artesan Tool & Cutter Co., 531 Vester St., Ferndale 20, Mich. Claimed to permit the boring of straight and tapered or contoured holes in a single cut, the attach-



Reeve Turret Attachment Installed on a Turret Lathe

ment can be quickly set to any required diameter and taper, with either tapered or straight holes bored without making any change in the setup except for moving back the top slide. The size and taper at the face of the stock are said to be held the same from piece to piece regardless of variations in length of stock.

MARK and DEMAGNETIZE IN ONE OPERATION

THE
Luma
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The Luma combination etchtool and demagnetizer, etches, demagnetizes, anneals and solders. Permanently marks hardest steel with ease of a pencil. Write for complete information.

Luma Electric Equipment Co.
P. O. BOX 132-MS TOLEDO 1, OHIO

New Shop Literature

Bristol Hydraulic Cylinders. A catalog prepared by the Bristol Machine Tool Co., 913 Wood St., Bristol, Pa., contains photographic illustrations, dimensional drawings, and descriptions of hydraulic cylinders suitable for 1,500 p.s.i. oil pressure and featuring nine possible mountings from one basic cylinder. Copy of Catalog 100, together with standard price list of Bristol hydraulic cylinders, is available free upon request.

Economy Drill Jig Bushings. An eight-page dimensional and price data sheet on A.S.A. Standard slip renewable bushings, headless liners, fixed renewable bushings, headless press fit bushings, and head press fit bushings has been prepared by the Economy Tool & Machine Co., 1829 S. 68th St., Milwaukee 14, Wis. A table of drill sizes and decimal equivalents, as well as information on drill jig bushings for designing and purchasing departments, is also included. Copy of Dimensional Data Sheet No. 4-A free to individuals addressing requests on their company letterheads.

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Manufacturers of
The Gammons Helical Flute Reamer
The Gammons Helical Flute Reamer
The Gammons Helical Flute Reamer
The Gammons Helical Flute Reamer
Special reamers for special work

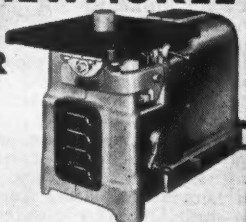
THE GAMMONS-HOAGLUND CO.
MANCHESTER CONNECTICUT

"Modern Milling Cutters for Modern Milling Machines" is the title of a 60-page two-color catalog now being distributed by The O. K. Tool Co., Inc., Shelton, Conn. The catalog presents complete information on all O. K. milling cutters, reamers, boring heads, counterbores, and special design tools. It also contains interesting material pertaining to the use of carbides in milling, together with a full page chart on feeds and speeds for operating. Each subject is illustrated with photographs or line drawings. Copy of Catalog No. 13 free upon request.

The MILWAUKEE

PROFILE GRINDER

For
Precision
Grinding of
Internal and
External
Profiles



High speed, reciprocating-spindle grinder. FEATURES: Low Cost; 20,000 RPM Spindle Speed; Surplus Power for Wheels up to 1½"; 4-Way Tilting Table; Collet Chuck; Diamond Wheel Dresser. Supplements the MILWAUKEE DIE FILER.

Write for Bulletins on Both Machines.

Milwaukee

CHAPLET & MANUFACTURING CO.

1041 S. 40th ST., MILWAUKEE 4, WIS.

Cincinnati No. 0-8 Vertical Milling Machine, product of The Cincinnati Milling Machine Co., Cincinnati 9, Ohio, is the subject of a 16-page bulletin published by this firm which presents fully illustrated descriptions of the machine, as well as specifications. Copy of Publication No. M-1532 free upon request.

Walsh Presses. Ten models of open-back inclinable punch presses in capacities from 6 to 90 tons are shown in conjunction with complete specifications in a six-page bulletin released by the Walsh Press and Die Co., Division of American Gage & Machine Co., 4709 W. Kinzie St., Chicago 44, Ill. Copy free upon request.

Lyon-Raymond Hydraulically-Operated Material Handling Equipment, including lift trucks, pallet trucks, elevating tables, high lift trucks, and sheet feeding equipment, is illustrated and described in a four-page bulletin published by the Lyon-Raymond Corp., 3621 Madison Ave., Greene, N. Y. The cover of the bulletin is a panorama of typical applications of the products. Copy of Bulletin 201 free.

Standard Buffing and Polishing Machines. The Standard Electrical Tool Co., 2487 River Rd., Cincinnati 4, Ohio, now has available a 16-page catalog illustrating and describing its line of heavy duty and extra heavy duty buffing and polishing machines in sizes ranging from ½ to 60 h.p. The catalog also covers the company's line of infinitely variable speed buffing and polishing machines with the "Speedial" control which permits any desired speed between 1,500 and 3,000 r.p.m. to be instantly obtained. Copy of Catalog B-10 free upon request.

Make it a Habit . . .

to refer to the "Where to Get It" section of MODERN MACHINE SHOP when you're in the market for machinery, tools and supplies. See pages 392, 393, 394. Easily identified by the black spaced edge rules on these three pages.

MODERN MACHINE SHOP

431 MAIN STREET • CINCINNATI 2, OHIO

"Di-Acro" Catalog No. 47-12. An entirely new edition of the "Di-Acro" Catalog which provides up-to-the-minute information on the Di-Acro System of Die-Less Duplicating is announced by the O'Neil - Irwin Manufacturing Co., 306 Eighth Ave., Lake City, Minn. This 40-page catalog contains illustrations and specifications covering all the Di-Acro benders, brakes, shears, and rod parters which can be employed individually or cooperatively for the precision production of a wide variety of parts. Many "on the job" photographs provided throughout the catalog illustrate the flexibility of these machines in both experimental and production work on products which may vary from miniature electronic parts to heavy agricultural equipment. Copy of Catalog No. 47-12 free upon request.

"Plastic-Seal," a skin-tight protective coating which is said to be ideal for use in the storing, protecting, or shipping of parts having highly finished precision surfaces, is fully discussed in a four-page illustrated folder published by the Plastic-Seal Div., Globe Imperial Corp., 2034 Kishwaukee St., Rockford, Ill. Copy free upon request.

"Combustion Systems and Burners" is the title of a 12-page booklet released by the Surface Combustion Corp., Toledo 1, Ohio. The booklet explains the basic principles of gas-fired combustion systems in easy-to-understand language and also describes the four broad classifications of burners; namely, atmospheric, immersion, low pressure, and high pressure types. The booklet tells how these burners function and provides recommended applications. Sectional drawings of the various types of burner equipment and charts illustrate the text. Copy free.

"Small Holes in a Hurry" is the title of a bulletin now being issued by The Dumore Co., Racine, Wis., which illustrates and describes a sturdy self-contained high speed electric drill, known as the "Drillspeeder," that is designed to fit into the chuck of any standard drill press, lathe, milling machine, or special machines and fixtures for use in drilling holes up to $\frac{1}{4}$ inch in diameter. Copy of Bulletin 730 free upon request.

Hy-Level Liquid Pressure Bar Feed Attachment for application to most single-spindle automatic screw machines for all bar feeding operations is fully illustrated and described in a four-page folder now being distributed by the Hy-Level Screw Products Co., 2114 W. Superior Ave., Cleveland 13, Ohio. Copy free.

AAF Replaceable Type Air Filters. The application of replaceable type air filters for ventilating and air-conditioning systems is explained in an eight-page bulletin issued by the American Air Filter Co., Inc., 215 Central Ave., Louisville 8, Ky. Descriptions and illustrations of each type filter are provided, together with instructions for maintenance and detailed engineering and installation data. Copy of Bulletin No. 210 free upon request.

"American" Hole Wizard, a 32-speed radial drill, is the subject of a 40-page bulletin issued by The American Tool Works Co., Cincinnati, Ohio. Profusely illustrated, the bulletin is devoted to a presentation of the 13-inch, 15-inch, and 17-inch diameter column sizes with 4-foot, 5-foot, 6-foot, and 7-foot arm lengths. Copy of Bulletin No. 327 free.

'T' SURFACE GRINDER

*Its Simplicity
Insures Its Accuracy*

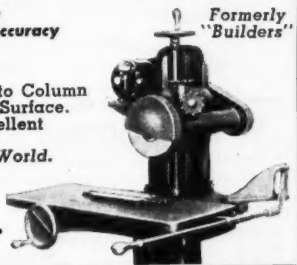
New PRECISION BALL BEARING SPINDLE

FOR PRECISION GRINDING
Capacity 4" x 8" x 10".
Lever Operated. No Gears
or Racks. Eliminates Backlash.
Bench or Floor Models.

Spindle Pivots Secured to Column
by "3 Point" Bearing Surface.
No Vibration. Excellent
Finish.
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Write for Bulletin

J. B. CROSMAN & SON, East Walpole, Mass.



Cincinnati Nos. 1-12 and 1-18 Plain Automatic Milling Machines are covered as to applications, features, and specifications in a 24-page profusely illustrated catalog published by The Cincinnati Milling Machine Co., Cincinnati 9, Ohio. Copy of Publication No. M-1555 free to executives upon request.

"Safety" Marking Tools. An eight-page bulletin featuring marking and stamping tools for every industrial marking purpose, especially designed to promote safety in all marking operations, has been published by the M. E. Cunningham Co., 158 E. Carson St., Pittsburgh 19, Pa. Copy of Bulletin J-547 free upon request.

"Grits and Grinds" Vol 38, No. 5 contains as its lead article a continuation of the discussion on "Injury in Ground Surfaces" by Dr. L. P. Tarasov. An article on "Lap Dressing" by H. S. Indge, Norton Company lapping engineer, is also included in the booklet, copy of which is available free from the Norton Co., Worcester 6, Massachusetts.

Rockford Hy-Jector Molding Machine for thermosetting plastics is fully described in a four-page illustrated bulletin issued by the Rockford Machine Tool Co., Rockford, Ill. Typical production facts and figures are included, as well as specifications of the eight-ounce capacity machine. Copy of Bulletin 147 free.

"Stop Hand Oiling" is the title of a folder now being distributed by the Trico Fuse Manufacturing Co., Milwaukee 12, Wis., which illustrates and describes the Trico Opto-Matic Oiler for automatic lubrication. Various other types of Trico Oilers are illustrated and described in the folder, copy of which is available free upon request.

Johnson Metal Cut-Off Band Saw is the subject of an eight-page illustrated catalog published by the Johnson Manufacturing Corp., Room 624, Chrysler Bldg., New York 17, N. Y. The catalog fully discusses the advantages and construction features of the unit and presents a table of general specifications. Copy free.

"Care and Maintenance of Diamond Tools for Dressing and Truing Grinding Wheels" is the title of the feature article in a recent issue of "Diamonds in Industry," house organ of J. K. Smit & Sons, Inc., 157 Chambers St., New York 7, N. Y. An article on synthetic jewels is also included in the 16-page booklet, copy of which is available free upon request.

Procnier Improved Series "A" Universal Tapping Machines. Three improved universal tapping machines are described and pictured in a two-color bulletin announced by the Procnier Safety Chuck Co., Dept. MMS, 18 S. Clinton St., Chicago 6, Ill. In addition to covering the Series "A" Tapping Machines, the bulletin illustrates and describes the "Hi-Boy" Lubricating Pump which is a feature of each machine and is designed to provide a continuous flow of lubricant to the tap.

Also shown in the bulletin is the new Procnier Foot - Operated Mechanism which enables tap driving and reversing pressures to be preset independent of the operator and regardless of pressure applied to the foot pedal. Procnier Sensitive High Speed Tapping Heads are also featured. Copy of Bulletin A-47 free.

The ORIGINAL HOLE SAW - For Every Purpose

MISENER

ROTARY HACK SAW



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HELPFUL!

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Folder!**

— if you have a

HOLE-CUTTING PROBLEM

—involving sheet metals, castings, wood,
plastics, fiber, tile or other materials.

We specialize in hole-cutting tools and blades.

MISENER MANUFACTURING CO., INC.
202-S Walton St. Syracuse 2, N. Y.

Morse Hi-Helix End Mills, specially heat treated for high speed slotting, channeling, profiling, and general milling operations, are featured in a 16-page pocket-size catalog announced by the Morse Twist Drill & Machine Co., New Bedford, Mass. The catalog includes illustrated, descriptive, and tabular information, including prices, on both single and double-end type end mills of 18-4-1 high speed steel. Copy free upon request.

Diamond Bench Mill and Accessories. A four-page blue catalog on the Diamond Bench Mill and milling machine accessories is now being distributed by the Diamond Machine Tool Co., 3429 E. Olympic Blvd., Los Angeles 23, Calif. The bulletin, which has the price of the milling machine printed in large type on the front cover, includes 20 illustrations and is available free upon request.

Cincinnati Press Brakes. A 64-page plastic-bound catalog published by The Cincinnati Shaper Co., Cincinnati 25, Ohio, presents illustrated and descriptive information on Cincinnati All-Steel Press Brakes and their use in forming, progressive forming, corrugating, corrugating and curving, notching and forming, punching, punching and trimming, punching and notching, embossing, and other metal-working operations. Various features comprising the machines are individually illustrated and described, and helpful data sheets on standard sizes of Cincinnati All-Steel Press Brakes are included. Data on various types of dies used in performing operations on press brakes are also provided in the catalog.

Executives desiring free copies of Catalog B-2 are requested to write direct to the company on their firm letterheads.



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Write today for prices. A few territories open.

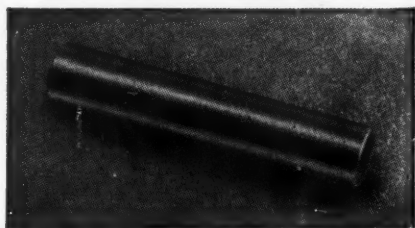
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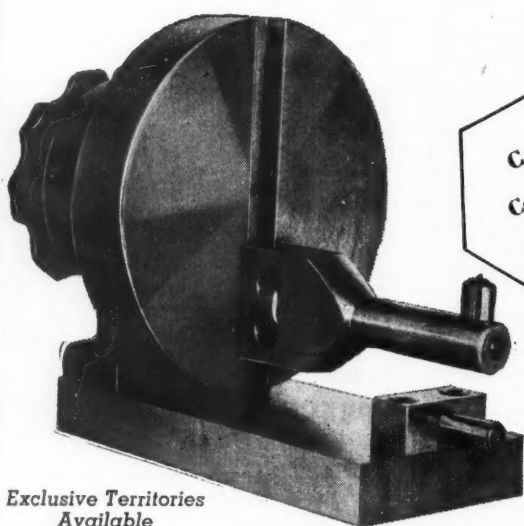
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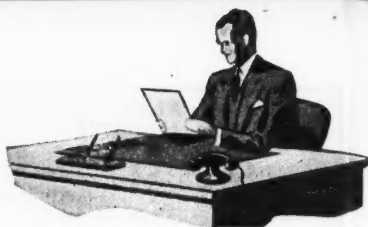
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WHERE TO GET IT



Numbers shown are page numbers in this issue

- Abrasive Cloth, Paper, Discs, Belts, Stones, Etc.,** 16, 17, 59, 68, 69, 201
- Adapters,** 8, 9
- Air-Operated Equipment** (Look for specific item)
- Alloys,** 357, 366
- Angles,** 179, 380
- Arbors,** 8, 9
- Balancing Machines,** 7
- Balancing Ways,** 205
- Bar Feeds, Pneumatic,** 115
- Bases, Machine,** 167, 344
- Bearings, Roller,** 1, 71, 269, 297
- Bearings, Sleeve,** 159
- Bearings, Special,** 269
- Bearings, Thrust,** 1
- Belting,** 242
- Belt Lacing Equipment,** 242
- Benches, Work,** 179, 335
- Bending Devices,** 104, 325
- Bending Machines,** 79, 151, 198
- Bins,** 182
- Bits, Power,** 20
- Blades, Cutting-Off,** 144
- Blocks, V,** 64, 179
- Blowers,** 106
- Bolts,** 239, 247, 338
- Boring Bars,** 215, 321
- Boring Heads,** 349
- Boring Machines,** 91, 141
- Boring Mills, Horizontal,** 39
- Boxes, Shop,** 331, 347
- Brakes, Press and Bending,** 129, 266, 341
- Broaches,** 21, 140, 215
- Broaching Fixtures,** 140
- Broaching Machines,** 8, 9, 133, 215
- Bronze Bars,** 159
- Brushes, Wire Wheel,** 16, 17
- Buffers, Portable Electric,** 404
- Buffing Machines,** 30, 291, 404
- Burs,** 194, 273, 292
- Bushings, Adapter,** 246
- Bushings, Drill Jig,** 310, 339, 360, 365
- Bushings, Guide Pin,** 213
- Bushings, Rotary,** 48
- Cams,** 362, 375
- Carbides,** 113, 120
- Castings, Machine,** 91
- Cement,** 347
- Centering Machines, Automatic,** 6, 151
- Centers, Lathe, Planer, Miller, Etc.,** 289, 328
- Charts, Radius,** 50
- Checking Rolls,** 320
- Chisels,** 315
- Chucking and Indexing Fixtures,** 291
- Chucking Machines, Automatic,** 141, 197
- Chucks, Air,** 53, 245, 263, 332
- Chucks, Collet,** 8, 9, 15, 162, 331, 356
- Chucks, Drill,** 20, 76, 77, 217, 323
- Chucks, Gear,** 286
- Chucks, Lathe,** 19, 183, 207, 245, 323
- Chucks, Magnetic,** 64, 78, 183
- Chucks, Tap,** 20
- Clamps,** 239, 275, 305, 312, 315
- Clinching Machines,** 102
- Clutches,** 166, 322
- Collets,** 8, 9, 162
- Comparators,** 219
- Compressors, Air and Gas,** 106, 153
- Coolants,** 137, 145, 257
- Counterbores,** 215, 328, 350
- Countersinks,** 215, 310
- Couplings, Air,** 152
- Couplings, Flexible,** 250, 322
- Cut-Off Machines,** 151, 251, 404
- Cut-Off Wheels,** 25, 68, 69
- Cutters, Keyway,** 260, 387
- Cutter Sharpening Machines,** 8, 9, 400
- Cutters, Milling,** 8, 9, 177, 215, 328, 389
- Cutters, Tapered,** 329
- Cylinders, Hydraulic and Pneumatic,** 53, 102, 245, 309
- Demagnetizers,** 183
- Desks,** 335
- Diamonds and Diamond Tools,** 84, 85, 255, 327, 353, 362
- Diamond Wheels,** 68, 69
- Die Cushions, Pneumatic,** 316
- Die Feeds,** 271, 277
- Die Heads, Threading,** 2, 15, 197, 307
- Die Making Machines,** 44, 156
- Dies,** 15, 241, 333, 342
- Die Sets,** 99, 298, 335
- Die Try-Out Presses,** 280
- Dividing Heads,** 183, 268, 278, 364
- Dogs, Lathe, Grinder and Miller,** 122, 239
- Dressing Fixtures, Grinding Wheel,** 309, 326, 388
- Dressing Tools,** 84, 85, 255, 312, 353, 362
- Drill Heads,** 178, 276, 305, 325, 327, 382, 329
- Drill Indexes,** 329
- Drilling Attachments,** 155
- Drilling Machines, Bench,** 18, 54
- Drilling Machines, Multiple Spindle,** 150
- Drilling Machines, Radial,** 14, 24, 131, 139, 251
- Drilling Machines, Vertical,** 14, 18, 22, 75, 131, 142, 150, 251, 397
- Drilling, Milling, Tapping and Screw-Inserting Machines, Automatic,** 237
- Drilling Units,** 22, 56, 286

Drills, Center, Core, Twist, Square, Etc., 210,
 215, 258, 260, 301, 325, 328, 349, 372, 395
 Drills, Portable Electric, 16, 17, 62, 147, 153, 404
 Drills, Portable Pneumatic, 37, 106, 153
 Drives, 243
 Drives, Motor, 243
 Dust Control Equipment, 46, 66, 164, 171, 208,
 400, 404
 Engines, Diesel, 106, 153
 Engraving Machines, 116, 343
 Envelopes, 305
 Etchers, 303, 383
 Extension Sockets, 118
 Facing Heads, 333
 Feed Fingers, 162
 Feed Units, 31, 229, 277, 279, 378
 Files, 29, 55, 92, 161, 307
 Files, Portable Electric, 38
 Files, Rotary, 15, 29
 Filing Machines, 212
 Flexible Shaft Equipment, 15, 16, 17, 43, 168,
 191, 251, 367
 Forming Machines, 58, 79
 Frames, Machine, 167
 Furnaces, Heat-Treating, 174, 231, 324, 373
 Gage Blocks, 221, 267, 340, 363
 Gages, 64, 65, 73, 86, 98, 140, 207, 211, 219, 221,
 288, 293, 319, 340, 346, 365
 Gear Cutting Attachments, 261
 Gear Cutting Machines, 11
 Gears and Gear Units, 4, 240, 242, 285, 289, 302,
 336, 358, 362, 372
 Gear Tooth Pointing Machines, 111
 Graduating Machines, 87
 Grinders, Abrasive Band and Disc, 323
 Grinders, Abrasive Belt, 40, 157
 Grinders, Air, 37, 41, 153, 327
 Grinders, Bench, 16, 17, 33, 62, 173, 404
 Grinders, Carbide Tool, 30, 96
 Grinders, Centerless, 8, 9
 Grinders, Chip Breaker, 47
 Grinders, Cutter and Tool, 12, 13, 30, 44, 107
 Grinders, Cylindrical, 8, 9, 12, 13, 82
 Grinders, Die, 30
 Grinders, Disc, 30
 Grinders, Drill, 44, 330, 400
 Grinders, Face, 12, 13
 Grinders, Face Mill, 44
 Grinders, Flute, 370
 Grinders, Gear, 64, 82
 Grinders, Internal, 3, 12, 13, 30
 Grinders, Knife, 312
 Grinders, Pedestal, 33, 243, 381, 404
 Grinders, Portable and Tool Post, 30, 117, 143,
 348, 404
 Grinders, Portable Electric, 16, 17, 37, 62, 147,
 307
 Grinders, Profile, 384
 Grinders, Snagging, 30
 Grinders, Special Purpose, 82, 195
 Grinders, Spline, 64, 82
 Grinders, Surface, 12, 13, 64, 107, 157, 233, 385
 Grinders, Tap, 295, 400
 Grinders, Universal, 3, 51, 82
 Grinders, Valve Seat, 16, 17
 Grinding Compounds, 306

Grinding Fixtures and Attachments, 12, 13, 313
 Grinding Wheels, 16, 17, 32, 34, 35, 63, 68, 69,
 117, 173, 201, 202, 203
 Guns, Air, 152
 Hammers, 312, 319, 339
 Hammers, Portable Electric, 62
 Hand Tools, Power (Look for specific item)
 Hardness Testing Devices, Front Cover, 320
 Hinges, 216, 329
 Hoist Hooks, 239
 Holders, Bit, 20
 Holders, Knurl, 361
 Holders, Tap, 253, 281, 368
 Holders, Tool, 20, 122, 144, 239, 297, 356, 368,
 400
 Holders, Type, 333
 Hole Cutters, 386
 Honing Machines, 91, 249
 Hopper Units, Motorized, 256
 Hydraulic Equipment (Look for specific item)
 Indicators, 211, 219, 265
 Iron Working Machines, 58
 Jacks, 122
 Jig Bore, 14
 Jigs and Fixtures, 207, 268, 272, 311, 372
 Joints, Universal, 20, 305
 Keys, Socket Screw, 293, 337, 343
 Keyway Cutting Machines, 323, 344
 Lapping Compounds, 306
 Lapping Heads, 247
 Lapping Machines, 91
 Lathes, Automatic, 7, 19, 23
 Lathes, Bench, 51, 54, 163, 190, 214
 Lathes, Engine and Toolroom, 7, 49, 51, 52, 67,
 70, 83, 88, 95, 114, 139, 206, 379, Third Cover
 Lathes, Polishing, 251
 Lathes, Speed, 30, 282, 404
 Lathes, Turret, 7, 19, 51, 141
 Layout Materials, 146, 354
 Lead Products, 339
 Lighting Equipment, 289
 Locating Tools, Optical, 295, 299
 Lubricants, 137
 Mallets, Rawhide, 242
 Mandrels, 260
 Mandrels, Expanding, 217, 345, 374
 Marking Machines, 100, 296, 299, 376
 Micrometers, 65
 Milling Machine Attachments, 105, 235, 290, 293
 Milling Machines, Bench, 54, 214, 293
 Milling Machines, Hand, 290
 Milling Machines, Horizontal, 8, 9
 Milling Machines, Universal, Second Cover, 8,
 9, 26, 27, 52, 105, 399
 Milling Machines, Vertical, 10, 227
 Mills, End, 50, 215, 328
 Mills, Hollow, 369
 Molds, 339
 Molding Machines, 79, 303
 Motors, 33, 57, 243, 251
 Mounted Points and Wheels, 34, 35, 68, 69, 117
 Nibblers, 274, 297, 304
 Numbering Machines, 350
 Nut Setters, Portable Electric, 62, 404
 Oilers, 93

Optical Flats, 221, 340
 Pans, Tote, 274
 Parallels, 179
 Pillow Blocks, 269
 Pins, 337, 343, 387
 Planers-Millers, 39
 Planers, 39, 90
 Plates, Angle, 64, 179
 Plates, Bench, 179
 Plates, Lapping, 179
 Plates, Surface, 64, 179
 Pliers, 325
 Polishing Machines, 16, 17, 30, 62, 157, 269, 291
 Polishing Wheels, 32, 34, 35, 63
 Presses, Arbor, 21, 79, 287
 Presses, Foot, 287
 Presses, Hydraulic, 53, 79, 80, 81, 175, 309
 Presses, Molding, 349
 Presses, Punch, 80, 81, 110, 112, 149, 240, 291, 294
 Presses, Pneumatic, 309
 Presses, Sub, 380
 Presses, Try-Out, 280
 Profiling Machines, 151
 Pullers, 301
 Pumps, Coolant and Lubricant, 36, 53, 94
 Pumps, Centrifugal, 106
 Pumps, Hydraulic, 103
 Pumps, Vacuum, 153
 Punches, 241, 315, 342, 352
 Punch Press Feeds, 31, 196, 240, 277, 378
 Racks, Bar and Tube, 322
 Racks, Tool, 307
 Reamers, 210, 215, 260, 328, 383
 Rectifiers, 183
 Reciprocating Tools, Electric, 38
 Resurfacing Materials, Floor, 347
 Rings, Retaining, 181
 Riveting Machines, 102, 274, 309, 343
 Roll Feeds, 196, 378
 Rolls, Checking and Setting, 320
 Roll Forming, 58
 Safety Equipment, Press, 180, 341
 Sanders, Portable Electric, 16, 17, 62, 147
 Sanders, Portable Pneumatic, 37
 Saw Blades, Band, 108, 121, 199, 265, 283, 318, 331
 Saw Blades, Circular, 45, 55
 Saw Blades, Hack, 28, 55, 199, 265, 318, 331
 Saw Frames, Hack, 318
 Saw Guides, Band, 359
 Sawing Machines, Band, 101, 108, 209, 223, 251
 Sawing Machines, Circular, 45, 218, 251, 341
 Sawing Machines, Hack, 28, 42, 103, 172, 183
 Saw Sharpening Machines, 45, 312
 Saws, Portable Electric, 147
 Screw Drivers, Hand, 20, 193
 Screw Drivers, Portable Electric, 62, 404
 Screw Drivers, Portable Pneumatic, 106
 Screw Machines, Automatic, 141
 Screw Machine Tools, 375
 Screws, Cap. Set, Socket and Machine, 74, 165, 301, 338, Fourth Cover
 Screws, Transfer, 252, 347
 Services: Milling, Grinding, Lapping, Rebuild-
 ing, Repairing, Business, Etc., 64, 188, 287, 291, 295, 302, 317, 351, 372, 390, 391
 Shaper-Planers, 90
 Shapers, 52, 54, 67, 72, 90, 129
 Shearing Machines, 80, 81, 129, 287
 Shears, Portable Electric, 147
 Shims, 248, 314
 Sine Bars, 64
 Slitting Machinery, 58
 Slip Roll Forming Machines, 270
 Slotting Machines, 90
 Sockets, 20, 122, 239
 Solenoids, 197
 Spacing Collars, Arbor, 314
 Special Machinery, 7, 24, 111, 133, 204, 288, 303
 Speed Reducers, 60, 254, 358
 Spot Facers, 185, 215, 328, 350
 Spot Facing Machines, Back, 64
 Springs, 299
 Spring Winders, 148
 Stampings, Pressed Metal, 345
 Stamps, 333, 335, 339, 376
 Steel, Die, 61
 Steel, General Purpose, 61, 366
 Steel Stock, Ground Flat, 61, 265, 366
 Stops, 334
 Straightedges, 179
 Straightening Machines, 79
 Superfinishing Machines, 7
 Surfacing Machines, Abrasive, 40, 251, 291
 Switches, 183
 Tables, Elevating, 109, 142
 Tables, Feed, 31
 Tables, Rotary and Index, 227, 319, 354, 368, 374
 Tachometers, 302
 Tapes, Measuring, 265
 Tap Extractors, 303
 Tappers, Portable Electric, 404
 Tapping Attachments, 15, 75, 253, 347
 Tapping Machines, 19, 142, 253
 Tapping Machines, Automatic, 19
 Tapping Units, 286
 Taps, 65, 169, 173, 184, 197, 307
 Tap Guides, 158
 Testers, Air Line, 41
 Threading Machines, 19, 97
 Tool Bits, 55, 113, 120, 215, 225, 258, 328, 372
 Tool Blanks, 89, 300, 328
 Tool Cribs, 192
 Tools, Boring, 119, 328, 355
 Tools, Bottoming, 119
 Tools, Box, 337
 Tools, Chamfering, 292
 Tools, Cutting Off, 215, 328
 Tools, Deburring, 292
 Tools, Facing, 119, 355
 Tools, Form, 84, 85, 215
 Tools, Internal Threading, 119
 Tools, Rack, 307
 Tools, Special Cutting, 258, 328
 Turrets, Lathe, 287, 377
 Valves, 53, 152, 170, 189, 245, 263, 309, 345
 Vises, Bench and Machine, 38, 160, 183, 200, 210, 245, 255, 284, 322, 333, 337, 361, 364, 371, 374
 Wrenches, 20, 74, 122, 239, 259

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"Oxyacetylene Cutting in Sheet Metal Work" is the title of a 12-page article reprint prepared by the Air Reduction Sales Co., 60 E. 42nd St., New York 17, N. Y. The article, written by R. F. Helm-kamp, Airco's flame cutting specialist, is illustrated with 22 photographs and line drawings. The first half of the article covers fundamentals of machine gas cutting, equipment needed, and the cost of operation. The last half concerns itself with specific shop applications of the process, such as stack cutting. Reference is also made to Airco's new flux-injection method for cutting stainless steel. Copy of the reprint is available free.

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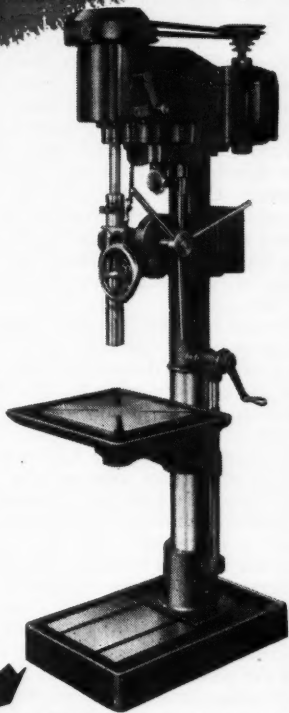
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The Time Has Come for a Revolution!

THE time has come when, if we who call ourselves Americans are to maintain our rights to "life, liberty and the pursuit of happiness," we must rededicate our nation to the cause of freedom and justice for all. As a nation we have become expert in the fashioning of tools with which, working in groups, we have been able to bring the luxuries of life within the reach of the masses, thus increasing national wealth and raising the living standards of all. Now, however, many of these groups are attempting by force to obtain extra shares of the national wealth, disrupting the natural processes of commerce and trade, increasing the cost of living, and lowering the living standards of all who do not belong to the organized groups.

The time has come for a revolution in the attitude of the American worker toward his job. Most Americans like to feel that they can look any man in the eye, but many of those same Americans will accept from an employer the wage for an honest day's work and then deliberately reduce their output. To do less than an honest day's work is as dishonest as stealing money from the employer's till. The worker who doesn't want to deliver honest effort for his share in the proceeds of the business should quit; this is a free country, and he doesn't have to stay at that job. But if he *does* stay, he should remember that he cannot succeed unless his employer succeeds also.

The time has come for a revolution in the thinking of the worker who believes that all employers take an unfair share of the proceeds of the combined effort. Any intelligent, reasonable person will agree that money saved and put to work should earn a fair return, and in a number of instances groups of workers have agreed that a "fair return" should be up to 10 per cent on the gross volume of sales. As a matter of fact, the average net earnings throughout industry are less than 5 per cent, and more often will run around 3 per cent.

The time has come for a revolution in the thinking of the worker who believes that the average employer can raise wages without raising the price of his product. As a matter of fact, since 1939 the wages of the factory workers of this country have risen 105 per cent while the cost of living has increased 58 per cent. That means that the unorganized workers have had to take a lot less than 58 per cent—actually less than a 25 per cent increase.

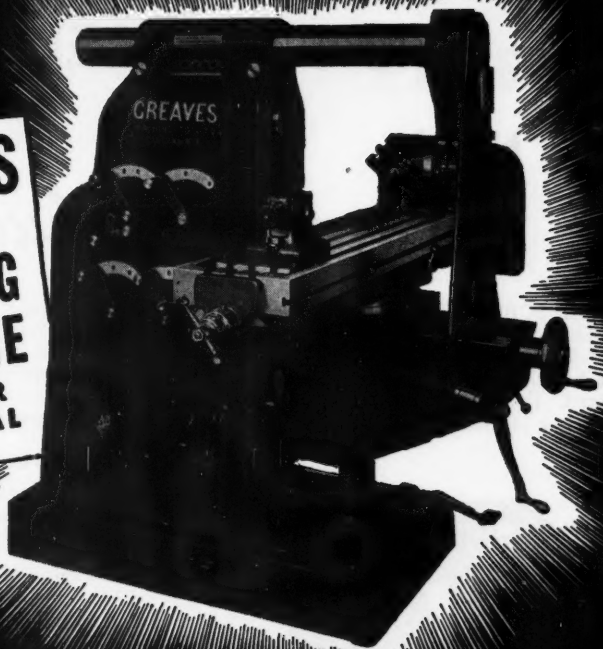
The time has come for American workers to realize that they cannot create wealth by taking it away from someone else. America has become the wealthiest country on earth because we have been able, through the use of labor-saving, high production machines and tools, to multiply the production of each individual worker. As production per worker is increased, costs per unit of product are decreased; thus selling prices are decreased and the products are made available to more people. Automobiles, radios, refrigerators, bathroom equipment, good furniture and modern housekeeping accessories made available to the public at low prices are actually wealth, just as much as so much gold would be if all of these things were so expensive that they could be classed only as luxuries.

On the other hand, when workers refuse to use high production tools and restrict production, they are forcing higher prices for their products, keeping them out of the reach of the lower income groups and thus lowering the level of national living standards, limiting the market for the product, and eventually reducing their own opportunities for jobs. It is smart to be honest, and the loafing, dishonest worker is stupid indeed.

The time has come for a revolution in the attitude of loyal Americans everywhere toward the misleading propaganda that is constantly being fed to workers—and that means pretty nearly all of us—by trouble-making Communists and ambitious, self-seeking labor leaders. A great misunderstanding has been fostered between employers and employees as to the principles upon which universal prosperity is founded, and the time has come for all employers to teach their employees the truth regarding these principles, so that this misunderstanding may be corrected.

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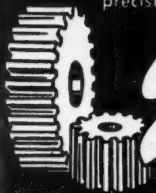
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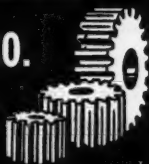
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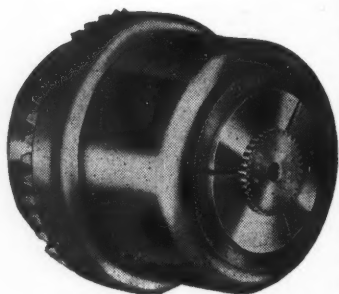
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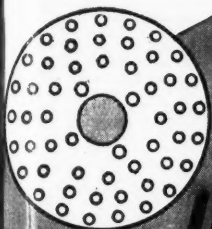
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INDEX TO ADVERTISEMENTS

A-K Tool Co.	287	Boggis & Co., H. P.	295
Abart Gear & Machine Co.	358	Bokum Tool Co.	119
Abrasive Machine Tool Co.	87	Boyar-Schultz Corp.	247
Ace Tool & Die Works.	294	Boye & Emmes Machine Tool Co.	33
Acme-Danneman Co., Inc.	298	Bremil Mfg. Co.	333
Acme Industrial Co.	360	Brewster-Squires Co.	303
Acme Tool Co.	38	Brighton Screw & Mfg. Co.	301
Acme Tool Mfg. Co.	311	Brown-Brockmeyer Co., Inc.	33
Acme Wire & Iron Works.	192	Brown Engr. Co.	322
Acromark Co.	296	Brown & Sharpe Mfg. Co.	73
Advance Machine Works	305	Buehrle & Son, Inc., Philip H.	295
Aero Tool Co.	310	Buffalo Forge Co.	18
Agnet-Detroit Co.	46	Bullard Co.	204
Albertson & Co., Inc.	16, 17	Burke Machine Tool Co.	293
Alco Tool Co.	281	Busch Co., J. C.	350
Allen Co., A. K.	31		
Allied Products Corp.	342	Cadillac Cutter Co.	329
Almond Mfg. Co., T. R.	323	Carboloy Co., Inc.	120
Alpha Tool Works	290	Carborundum Co.	68, 69
American Air Filter Co.	66	Carroll-Jameson Machine Tool Co.	206
American Broach & Machine Co.	133	Carson-Newton Co.	307
American Emery Wheel Works.	25	Center Scope Products Co.	299
American Pipe Bending Machine Co.	198	Cerro de Pasco Copper Corp.	357
American Saw & Mfg. Co.	121	Challenge Mehry. Co.	179
American Society of Tool Engineers.	317	Chandler Tool Co.	355
American Swiss File & Tool Co.	92	Chicago Drilllet Corp.	272
American Tool Works Co.	139	Chicago Pneumatic Tool Co.	153
Ames Co., B. C.	219	Chicago Rawhide Mfg. Co.	242
Anderson Bros. Mfg. Co.	205	Chicago Screw Co.	165
Apex Machine & Tool Co.	20	Chicago Tool & Engr. Co.	374
Armstrong-Blum Mfg. Co.	28	Chicago Wheel & Mfg. Co.	117
Armstrong-Bray & Co.	301	Cimcool Div., Cincinnati Milling	
Armstrong Bros. Tool Co.	122	Machine Co.	145
Arrow Broach Co.	140	Cincinnati Bickford Tool Co.	131
Atlantic Gear Works	362	Cincinnati Electrical Tool Co.	404
Atlas Press Co.	54	Cincinnati Gear Co.	372
Auto Engraver Co., Inc.	116	Cincinnati Milling Machine Co.	8, 9
Auto Moulding & Mfg. Co.	329	Cincinnati Planer Co.	39
Avey Drilling Machine Co.	22	Cincinnati Shaper Co.	129
		Cincinnati Tool Co.	315
Barnes Co., Inc., W. O.	283	Clark Instrument, Inc.	320
Bartelt Engr. Co.	293	Clatfelter Co., H. C.	246
Bath & Co., Inc., John.	65	Cleveland Punch & Shear Works.	241
Baumbach Mfg. Co., E. A.	335	Cleveland Republic Tool & Gage Co.	288
Bay, Inc.	331	Colonial Blower Co.	208
Bay State Abrasive Products Co.	201	Colonial Bushings, Inc.	339
Beaver Gear Works	336	Commander Mfg. Co.	305
Behr-Manning Corp.	59	Commercial Centerless Grinding Co.	287
Bellows Co.	228	Comtor Co.	346
Benchmark Mfg. Co.	110	Conner Tool & Cutter Co.	301
Benton Co.	295	Consolidated Mehry. & Supply Co., Ltd.	218
Besly & Co., Charles H.	173	Continental Tool Works, Div. of	
Bicknell-Thomas Co.	350	Ex-Cell-O Corp.	215
Billings & Spencer Co.	259	Cook, Inc., Lawrence H.	339
Black Diamond Saw & Machine Works, Inc.	330	Cooley Electric Mfg. Corp.	231
Black Drill Co.	258	Coulter Machine Co., James.	97
Blake Co., Edward	400	Crosman & Son, Inc., J. B.	385
Blank & Buxton Mehry. Co.	227	Cross Co.	111
Bloomfield Tool Co.	362	Cullman Wheel Co.	60
Bodine Corp.	237	Cunningham Co., M. E.	335

Dahlstrom Mfg. Co.	158
Dallett Co.	152
Danly Machine Specialties, Inc.	387
Danneman Die-Set Co.	298
Davis Keyseater Co.	323
Dayton Rogers Mfg. Co.	316
Dearborn, J. W.	291
Delco Products Div., General Motors Corp.	175
Denison Engr. Co.	175
Derbyshire, Inc., F. W.	190
Desmond-Stephan Mfg. Co.	255
Detroit Boring Bar Co.	321
Detroit Power Screwdriver Co.	256
Detroit Stamping Co.	275
Dickerman Mfg. Co., H. E.	277
Disston & Sons, Inc., Henry	55
DoAll Co.	108
Dornan Machine Tool Works	347
Dowding & Doll, Ltd.	261
Drels & Krump Mfg. Co.	266
Dremel Mfg. Co.	348
Ducon Co.	164
du Mont Corp.	21
Dumore Co.	148
Dykem Co.	146
East Shore Machine Products Co.	372
Eastern Tool Supply Co.	210
Economy Engr. Co.	109
Economy Tool & Machine Co.	365
Elk Tools, Inc.	297
Enco Mfg. Co.	377
Erickson Tools Div.	356
Errington Mechanical Laboratories	327
Esco Engr. Corp.	268
F & M Sales, Inc.	368
Fanco Machine Co.	287
Farrel-Birmingham Co., Inc.	4
Federal Products Corp.	211
Fellows Gear Shaper Co.	11
Firth Sterling Steel & Carbide Corp.	89
Fiske Bros. Refining Co.	257
Fitchburg Grinding Machine Corp.	82
Flynn Mfg. Co.	349
Fonda Gage Co.	363
Foot-Eburt Co.	75
Ford Motor Co., Johansson Div.	267
Foredom Electric Co.	367
Fosdick Machine Tool Co.	14
Fulford Specialties Co., Inc.	36
Fulmer Co., C. Allen.	91
Gallmeyer & Livingston Co.	107
Gammmons-Hoaglund Co.	383
Gear Specialties	285
Genales, Andrew	319
Glenn & Anhoitt Tool Co.	48
Gilman Engr. & Mfg. Co.	163
Gisholt Machine Co.	7
Gorton Machine Co., George.	Second Cover
Govro-Nelson Co.	56
Graham Mfg. Co., Inc.	361
Grant Mfg. & Machine Co.	274
Gray Machine Co.	274
Gray & Prior Machine Co.	305
Greaves Machine Tool Co.	240, 289, 399
Grob Brothers	212
Grobet File Co. of America.	29
Gwilliam Co.	297
HPL Mfg. Co.	345
Hamilton Tool Co.	142
Hammond Mchry. Builders, Inc.	47
Hanchett Mfg. Co.	78
Hanchett Mfg. Co., Saw & Knife	
Fitting Div.	312
Hannifin Corp.	309
Hanson-Whitney Machine Co.	6
Hartford Special Mchry. Co.	337
Harvey Mfg. Corp.	156
Haskins Co., R. G.	191
Heald Machine Co.	3
Helm Co.	269

Helmann Mfg. Co.	252
Hendey Machine Co.	67
High Speed Hammer Co., Inc.	348
Hjorth Lathe & Tool Co.	148
Holo-Krome Screw Corp.	Fourth Cover
Hunt & Son, Inc., C. B.	189
Illinois Coll Spring Co.	299
Independent Pneumatic Tool Co.	37
Industrial Products Suppliers	314
Ingersoll Milling Machine Co.	177
Ingersoll-Rand Co.	106
Jacobs Mfg. Co.	76, 77
Janette Mfg. Co.	264
Jarvis Co., Charles L.	15
Jefferson Machine Tool Co.	364
Jeon Mfg. Co.	326
Johnson Bronze Co.	159
Johnson Gas Appliance Co.	373
Johnson Mfg. Corp.	42
Junkin Safety Appliance Co.	341
Kalamazoo T. & S. Co.	101
Keene Valley Engr. Co.	334
Kemp Smith Machine Co.	105
Kennametal, Inc.	389
Keo Cutters	260
Kloppenburg Aluminum Foundry	319
Knight Mehry. Co., W. B.	10
Koebel Diamond Tool Co.	327
L-W Chuck Co.	183
LaBahn Machine & Mfg. Co.	378
Laminated Shim Co.	248
Landis Machine Co.	2
Landis Tool Co.	12, 13
LeBlond Machine Tool Co., R. K.	Third Cover
Lee Co., K. O.	217
Lehigh Foundries Inc., Marton Air	
Valve Div.	170
Lehmann Machine Co.	49
LeMaire Tool & Mfg. Co.	286
Lemco Products, Inc.	99
Lewthwaite Machine Co., T. H.	325
Lima Electric Motor Co.	243
Lincoln Park Industries, Inc.	86
Lincoln Park Mfg. Co.	372
Linderme Machine & Tool Co.	382
Lipe-Rollway Corp.	115
Littleford Bros., Inc.	344
Logansport Machine Co., Inc.	53
Lovejoy Flexible Coupling Co.	250
Lucas & Son, Inc., J. L.	274
Luers, J. Milton	144
Luma Electric Equipment Co.	383
M & N Machine Tool Works	349
Madison-Klapp Corp.	327
Mahon Co., R. C.	167
Mail Tool Co.	48
Manhattan Rubbe Div.	68
Marvel Tool & Machine Co.	289
Mattison Machine Works	157
Mead Specialties Co.	279
Meinhardt Diamond Tool Co.	362
Meyers Co., Inc., W. F.	313
Michigan Chrome & Chemical Co.	354
Michigan Drill Head Co.	178
Miller-Knuth Mfg. Co.	172
Millers Falls Co.	62
Milwaukee Chaplet & Mfg. Co.	384
Miracle Products Co.	331
Misener Mfg. Co., Inc.	386
Modern Machine Shop	384
Monarch Machine Tool Co.	88
Montgomery & Co., Inc.	388
Morris Machine Tool Co.	24
Motch & Merryweather Mehry. Co.	45
Mummert-Dixon Co.	333
National Acme Co.	197
National Machine Tool Co.	200, 304
National Tool Salvage Co.	249
National Twist Drill & Tool Co.	185

252	Nebel Machine Tool Co.	379
37	New Britain Machine Co.	
348	New Britain-Gridley Machine Div.	141
148	New Method Steel Stamps, Inc.	333
over	Niagara Machine & Tool Works	80, 81
189	Nichols-Morris Corp.	278
299	Nicholson & Co., W. H.	345
37	Nicholson File Co.	161
314	Nielsen Tool & Die Co.	347
37	Noble & Westbrook Mfg. Co.	350
106	Nobur Mfg. Co.	194
77	Norgren Co., Inc., C. A.	93
254	Norma-Hoffmann Bearings Corp.	71
15	North Bros. Mfg. Co.	333
364	Norton Co.	202, 203
326	Nu-Tangs, Inc.	351
159	Numberall Stamp & Tool Co.	376
373	Oliver Instrument Co., Inc.	44
42	Oliver Mehry, Co.	341
341	O'Neil-Irwin Mfg. Co.	104
101	Paddock Tool Co.	359
334	Parker Mfg. Co.	341
105	Plines Engr. Co., Inc.	151
389	Pittsburgh Stamp Co., Inc.	339
260	Porst Brothers	162
319	Porter-Cable Machine Co.	40
37	Porter Machine Co.	155
10	Pratt & Whitney, Div. of Niles-Bement-Pond Co.	273
327	Precise Products Co.	308
183	Preis Engraving Machine Co., H. P.	343
378	Proconair Safety Chuck Co.	253
248	Production Devices, Inc.	160
2	Production Machine Co.	291
13	Producto Machine Co.	271
over	Prosser & Son, Thomas	96
217	Quality Tool Works	387
170	Queen City Machine Tool Co.	381
49	Racine Tool & Machine Co.	103
286	Raybestos-Manhattan, Inc.	
59	Manhattan Rubber Div.	63
325	Reading Machine Co.	344
243	Redner Air Devices Corp.	283
86	Republic Gage Co.	98
352	Rivett Lathe & Grinder, Inc.	51
115	Roberts Rubber Co., Weldon	32
344	Robertson Mfg. Co.	34, 35
53	Rockford Clutch Div., Borg-Warner Corp.	166
250	Rockford Machine Tool Co.	90
274	Rogers Tool Corp., John M.	369
144	Rotor Tool Co.	41
383	Rouse & Co., H. B.	290
349	Royal Oak Tool & Machine Co.	195
327	Rusnok Tool Works	235
167	Ruthman Mehry, Co.	94
43	S & S Machine Works	216
63	Sales Service Machine Tool Co.	72
289	San Angelo Foundry & Mehry, Co.	270
157	Sanford Mfg. Co.	233
279	Sauerelsens Cements Co.	347
362	Savage Co., W. J.	297
313	Schauer Machine Co.	282
354	Scherr Co., Inc., George	340
178	Schmidt, Inc., Geo. T.	100, 299
172	Schultz & Anderson Co.	196
62	Screw Machine Specialty Co.	188
384	Scully-Jones & Co.	118
331	Seneca Falls Machine Co.	23
386	Service Machine Co.	149
384	Services Directory	390, 391
88	Severance Tool Industries, Inc.	292
388	Sheldon Machine Co., Inc.	52
24	Sibley Machine & Foundry Corp.	397
45	Sidney Machine Tool Co.	79
333	Skilsaw, Inc.	147
197	Skinner Chuck Co.	245
304	Smit & Sons, Inc., J. K.	353
249	Snap-On Tools Corp.	193
185	South Bend Lathe Works	95
	Spantun Saw Works	331

Springfield Machine Tool Co.	114
Stackbin Corp.	182
Standard Electrical Tool Co.	30
Standard Horse Nail Corp.	337
Standard Machinery Co.	213
Standard Pressed Steel Co.	74, 335
Standard Steel Specialty Co.	343
Standard Tool Co.	303
Stark Tool Co.	214
Starn Tool & Mfg. Co.	310
Starrett Co., L. S.	265
Sterling Factory Equipment Co.	347
Stevens Inc., John B.	319
Sticht Co., Inc., Herman H.	302
Stites Tool Co.	375
Strand Mfg. Co.	180
Strand & Co., N. A.	168
Strong, Carlisle & Hammond Co.	338
Strutz & Mead, Inc.	325
Sun Oil Co.	137
Sunnen Products Co.	249
Super Tool Co.	225
Surface Combustion Corp., Heat Treat Div.	174
Taft-Peirce Mfg. Co.	64
Tannewitz Works	223
Taylor & Fenn Co.	150
Taylor Machine Co.	302
Thermo Electric Mfg. Co.	324
Thompson & Son Co., Henry G.	199
Threadwell Tap & Die Co.	169
Thriftmaster Products Corp.	329
Timken Roller Bearing Co.	1
Tomkins-Johnson Co.	102
Torlt Mfg. Co.	171
Troyke Mfg. Co.	268, 354
Tungsten Electric Corp.	113
Union Drawn Div., Republic Steel Corp.	61
Union Twist Drill Co., Butterfield Div.	307
United States Drill Head Co.	276
United States Products Co.	306
Utica Drop Forge & Tool Corp.	325
Uydess & Sons, Inc., Benjamin	371
V & O Press Co.	240
Van Keuren Co.	221
Van Norman Co.	26, 27
Van Products Co.	284
Vanco Products Inc.	307
Velt & Young	364
Victor Mehry, Exchange, Inc.	395
Victor Saw Works	318
Vimco Mfg. Co.	289
Wade Instrument Co.	305
Waldes-Koh-I-Noor, Inc.	181
Walker-Turner Co., Inc.	251
Walls Sales Corp.	323
Waltham Machine Works	380
Walton Co.	303
Wardwell Mfg. Co.	370
Warner & Swasey Co.	19
Watson Mfg. Co.	337
Watts Bros. Tool Works	325
Weldon Tool Co.	50
Wells Mfg. Corp.	209
Wendt-Sonits Co.	328
West Coast Aero Tool Co.	310
Wheel Trueing Tool Co.	84, 85
Wheelock, Lovejoy & Co., Inc.	366
Whitney Chain & Mfg. Co.	293
Whitney Metal Tool Co.	352
Wiedemann Machine Co.	112
Wiley's Carbide Tool Co.	390
Williams & Co., J. H.	239
Williams Equipment & Supply Co.	291
Wilson, K. R.	79
Wilson Mechanical Instrument Co., First Cover	
Winter Bros. Co.	184
Woodworth Co., N. A.	207, 332
Yoder Co.	58
Young Arbor Co.	374
Ziegler Tool Co., W. M.	368



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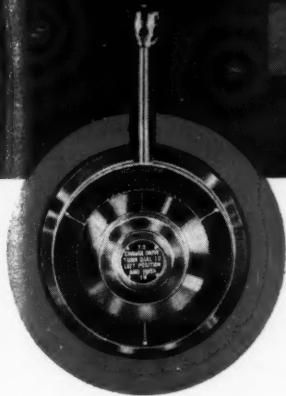
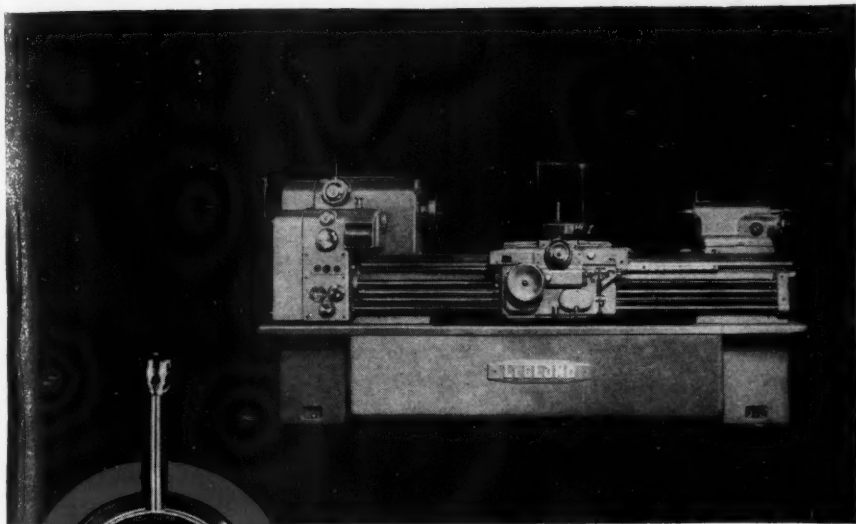
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without stopping spindle*

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Thrust-lock tailstock with worm and rack construction; full length bearing for spindle; direct reading spindle travel dial.

Arranged for 7½ hp adjustable speed main drive motor.

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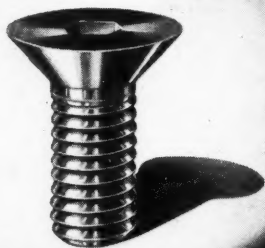


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SOCKET CAP SCREWS standard
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Another achievement of the Holo-Krome exclusive patented Completely Cold Forged method. Not drilled, broached or machined. The H-K new line of Flat Head Socket Cap Screws is made from special analysis alloy steel scientifically heat treated. Threads (Class 3 Fit) are accurate to lead and pitch. Sockets are of true hexagonal shape uniformly accurate to their full depth, smooth regular walls, well defined corners. H-K internal wrenching feature permits quick and positive tightening. . . . As always, H-K Flat Head Socket Cap Screws are only sold thru Holo-Krome authorized stock carrying distributors.

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